United States Court of Appeals
for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

366

FOR MR. JUSTICE VAN ORSDEL

UNITED STATES
~~COURT OF APPEALS~~ FOR THE
DISTRICT OF COLUMBIA
FILED DEC 10 1936
CLERK

United States Court of Appeals

For the District of Columbia.

April Term, 1936.

No. 6832.

56

KRUPP NIROSTA COMPANY, INC., and
BENNO STRAUSS,
Appellants,

AGAINST

CONWAY P. COE, COMMISSIONER
OF PATENTS,
Respondent.

Brief on Behalf of Plaintiffs-Appellants.

Roberts B. Larson,
Attorney for Appellants.

Fritz v. Briesen,
Of Counsel.

LIBRARY

THE ASSOCIATION OF THE BAR
OF THE CITY OF NEW YORK

Loder Appeal Press, Inc., 65-67 Duane St., N. Y. C. [illegible] Worth-2-0689

INDEX.

PAGE
Preliminary Observation 1
Statement of Facts 2
The Art to Which the Invention Relates 4
Definitions by Plaintiffs' Expert Professor Waterhouse 5

  Steel 6
  Chromium 6
  Chromium-Nickel Steel 6
  Iron Content 6
  Austenitic, As Distinguished From Ferritic, Steel 7
  Chemically Neutral 9
  Intergranular Corrosion 9

How Intergranular Corrosion Takes Place 11
Prior Art Solution of Problem 12
Dr. Strauss Finds Solution of Problem 13
The Invention in Issue 14
The Board's Decision 15
Decision of the Court Below 18
The Claims Here Sought 18
Errors Relied Upon 20
Outline of Argument 21

Point I.—The references do not not disclose austenitic chromium-nickel steels 21

  The Austenitic and Ferritic Field Chart 22
  Smith's U. S. Patent No. 1,538,360 25
    Smith's Specific Example 27
    Smith's So-Called Range 27
  What Does a Statement of "Range" Indicate? 27
    Smith Does Not Disclose Austenitic Steels 29
  Terni, French Patent No. 625,055 of 1927 32
  Everitt British Patent No. 267,024 of 1927 33
  Conclusion 35

PAGE

POINT II.—Whether or not Dr. Strauss' steels (alloys) were anticipated his invention is patentable 37

Dr. Strauss Made a Discovery 37
Decisions Below as to Patentability of Substitution of Materials 38
Substitution of Materials—the Law 39
Conclusion 47

POINT III.—Claims 25, 26 and 27 are not too broad 47

POINT IV.—Criticism of reference in the claims to "conditions of possible use" is not justified .. 52

POINT V.—Claim 28 is not objectionable as without foundation in the specification 58

Preliminary Observations 58
Claim 28 Discussed 61
Conclusion 63

TABLE OF CASES.

American Stainless Steel Co. *v.* Ludlum, 290 F. 103 50
American Sulphite *v.* Howland, 80 F. 395 42

Becket & Franks *v.* Schafmeister, Interference No. 67,408 .... 44, 53, 57

Carnegie *v.* Cambria, 185 U. S. 403 51

Danbury *v.* American Hatters, 54 Fed. (2d) 344 ... 55
Durham *v.* Seymour, 6 App. D. C. 78 .... 60, 61

George Frost *v.* Cohn, 119 F. 505 42
Fulweiler & Jordan, *Ex parte*, 24 U. S. Pat. Q. 268.. 43, 55

General Electric Co. *v.* Hoskins Mfg. Co., 224 F. 464.. 41, 54

Harbeck, In re, 39 App. D. C. 555 40
Hicks *v.* Kelsey, 18 Wall. 670 40

PAGE
LeRoy *v.* Tatham, 14 How. 156 ... 39
Loepsinger and Trafton, *Ex parte,* 25 U. S. Pat. Q. 332 ... 56
Lohrs, *Ex parte,* 28 U. S. Pat. Q. 550 ... 44
Lucke, *et al.* *v.* Coe, Commissioner of Patents, 69 F. (2d) 379 ... 60, 61

Miller, *Ex parte,* 26 U. S. Pat. Q. 336 ... 55
Munising *v.* American Sulphite Co., 228 F. 700 ... 42

Painter, *Ex parte,* 1891 C. D. 200 ... 56
Panzl *v.* Battle, 132 F. 607 ... 51
Remington *v.* Acme, 71 F. (2d) 628 ... 40

Smith *v.* Goodyear, 93 U. S. 486 ... 40

Treibacher *v.* Roessler, 219 F. 210 ... 51

United Chromium *v.* International Silver Co., 60 F. (2d) 913 ... 62

Weiger, *Ex parte,* 26 U. S. Pat. Q. 25 ... 43
Westmoreland *v.* Hogan, 167 F. 327 ... 42

TEXT BOOKS.

Mervin, Patentability of Inventions ... 39
Robinson on Patents—Vol. 1, Sec. 83 ... 16
Robinson on Patents—Vol. 2, pages 119-120 ... 54
Walker on Patents, Secs. 18, 60 ... 16

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA.

APRIL TERM, 1936.

KRUPP NIROSTA COMPANY, INC., and BENNO STRAUSS,
Appellants,

AGAINST

CONWAY P. COE, COMMISSIONER OF PATENTS,
Respondent.

No. 6832.

Brief on Behalf of Plaintiffs-Appellants.

This is an appeal from a decree of the Supreme Court of the District of Columbia (now District Court of the United States for the District of Columbia), dismissing a bill filed for the purpose of securing an adjudication, under R. S., Sec. 4915, that plaintiffs are entitled to receive a patent (refused them by the Patent Office) covering an invention of Dr. Benno Strauss relating to certain metal articles, made of austenitic chromium-nickel steel alloys, disclosed in his application Serial No. 330,429, filed January 4, 1929, and assigned to the plaintiff, Krupp Nirosta Company, Inc.

The case was tried before Mr. Chief Justice Wheat on March 12 and 13, 1936.

Preliminary Observation.

In order to assist the Court in relating the facts to the questions hereinafter to be discussed, the following brief outline of such questions is hereby given:

The claimed invention relates to certain metal articles (storage tanks, reaction vessels, etc.) for use in connection with corrosive substances, which articles are made of an *austenitic* chromium-nickel steel (alloy) *containing less than .07% of carbon.*

The Court below found, as a fact, that the alloy was old and concluded, as a matter of law, that the public was entitled to make any and every kind of article of such alloy, and that therefore no patent might validly issue upon any of such articles.

The first question is whether or not the references cited disclose the steels, and, if they do not, whether or not the invention is patentable.

The second question is (irrespective of the novelty of such steel *per se*) whether the discovery, by Dr. Benno Strauss, of certain unsuspected qualities of the steels which make them peculiarly suitable for resisting a certain type of corrosion, renders such metal articles patentable.

The third question is whether claims 25, 26 and 27 are broader than the disclosure.

The fourth question, not raised by the Court below, but apparently raised by the Board of Appeals, relates primarily to the form of the claim, namely whether or not the articles may properly be defined by reference "to conditions of possible use".

The fifth question is whether claim 28 is warranted by applicant's disclosure.

Statement of Facts.

Dr. Strauss' invention relates to certain metal articles which in their normal use are subjected to active corrosive influences and which, in their process of manufacture, or when in use, are necessarily subjected to the high temperature range of 600° to 900° C., for instance, because their component parts have been united by welding. These articles are made of what is known as austenitic chromium nickel steel, but containing less than .07% of carbon. For reasons hereafter to be explained, it is the use of this extraordinary low proportion of carbon which enables such articles to resist what is known as *intergranular corrosion* without first being subjected to a curative process (heating to high temperatures followed by sudden cooling, such as quenching).

Typical claims which most clearly bring out the inventive thought are Nos. 26 and 29 (R., 4). Claim ~~27~~ 26 reads as follows:

> 26. Metal articles which in their normal use are subjected to active corrosive influences,
>
> while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher temperatures,
>
> said articles being resistant to said corrosive influences and
>
> composed of an austenitic chromium-nickel steel alloy, free from intercrystalline fractures and corrodible segregated carbide and containing
>
> iron,
> chromium,
> nickel, and
> carbon,
>
> the iron being in excess of each of the other ingredients and
>
> the amount of carbon being not greater than 0.07%.

Claim 29 differs from claim 26 in specifying that iron is "a major ingredient", that the chromium content is 18% to 25%, and the nickel content from 7% to 12%.

The claims contain a slight, but substantially immaterial, clerical error in that they specify that the carbon content should be "not greater than .07%". The specification as originally filed, by which, of course, the entire application must be judged, specifies that the carbon content is "less than .07%" (R., 65). The claims, properly speaking, should therefore not read "not greater than .07%" but should read *"less than .07%"*.

While the specification speaks of the material as "a chromium-nickel steel alloy", materials of this type are, in common parlance, referred to as "steels", the word "alloy" being omitted (see, for instance, Prof. Waterhouse, R., 23, last paragraph). For the sake of brevity they will be referred to, hereinafter, as "steels", not as "steel alloys".

The Art to Which the Invention Relates.

It is believed necessary, for a clear understanding of the invention, and of the bearing of the testimony and exhibits upon the issues, to present an introductory exposition of the art to which the invention relates.

The claims in issue all relate to certain metal articles made of what is known in the art as "stainless steels". These stainless steels are not of the type first invented by Brearley (England), in or about 1912 (R., 23) which consist substantially of a mixture of chromium, iron and carbon, and have had a large sale, especially in the form of cutlery. They are of the type known as *chromium-nickel* stainless steels and, again, to the species thereof known as *austenitic* chromium-nickel steels, first patented by Dr. Strauss about seventeen years ago (R., 23, 56).

Stainless steels of this particular species of the austenitic chromium-nickel type have been on the market, both here and abroad, for many years (R., 57, 30, 54). The most typical alloy of this species, and the one most widely used, is known as "18-8", this meaning that it contains approximately 18 parts of chromium and 8 parts of nickel, the remainder being iron, except for certain proportions of carbon, and also small proportions of other alloying ingredients (R., 40). The carbon proportion runs from .12% to perhaps .15% (R., 31), or even lower and higher (.1% to .3%, R., 55). Dr. Strauss, in his specification (R., 65) says .1 to .4%.

These steels, as usually placed upon the market, have their iron content substantially all of the *gamma* crystal structure and are therefore known as "*austenitic* chromium-nickel steels" to distinguish them from steels of the same, or similar, composition in which the iron is of the *alpha* crystal structure, which latter may be called "*ferritic*" (these include the sorbitic, troostic, martensitic, and pearlitic forms of iron). The name "austenitic" is derived from austenite (named in honor of Sir William Roberts-Austen, a famous British metallurgist) which is a solid solution of carbon in *gamma* iron. In *austenitic* steels, the carbon is normally in solid solution in *gamma* iron. These steels are non-magnetic, *i. e.*, are not attracted by a magnet, while ferritic steels are magnetic (See detailed discussion, pp. 7-9, below).

As the invention cannot be understood without a clear understanding of the meaning of the various terms used in the specification and claims, it is believed that the following definitions will be helpful.

Definitions by Plaintiffs' Expert Professor Waterhouse.

While these definitions may be found in standard textbooks, they are here submitted on the authority of plaintiffs' witness, Dr. George E. Waterhouse, who is eminently qualified to testify in this case (R., 22-23). He is Professor of Metallurgy at the Massachusetts Institute of Technology in charge of production metallurgy, and his particular field has been iron and steel. His work is primarily with senior students and graduate students. He received his university education at the University of Sheffield, England, and at Columbia University, and he has had practical experience in the field of alloy steels. He is a member of the Committee on Corrosion and Heat Resisting Steels of the American Society for Testing Materials, and is connected with the Bureau of Standards, Metallurgical Division, being Chairman of the Advisory Committee of that particular Division. He was, and is now, connected as consulting metallurgist with the United States Bureau of Mines, and was recently appointed a member of the Advisory Committee for the whole Bureau. He has had a great deal of personal experience with austenitic chromium-nickel steels (R., 22-23).

Steel.

"Steel, as ordinarily understood, is an alloy of iron with carbon; and, just very generally speaking, we must have that combination of iron and carbon in order to have steel. The percentage of carbon varies from a very low percentage up to probably two per cent.; but, very broadly speaking, steel is an alloy of iron and carbon and owes its properties largely to the percentage of carbon and to the treatment that steel receives" (Waterhouse, R., 24).

Chromium.

Chromium is a metal which "is added to steel for a number of purposes". In connection with this invention, the important fact is "that chromium, when present in a sufficient amount, makes the steel resistant to corrosion so that * * * chromium makes the steel corrosion resistant" (Waterhouse, R., 24).

Chromium-Nickel Steel.

"A chromium-nickel steel is one containing both chromium and nickel, the chromium being there to confer resistance to corrosion and the nickel being there largely to confer ductility or workability to the steel" (Waterhouse, R., 24).

Iron Content.

A chromium-nickel steel is, of course, primarily a steel, and therefore must have the characteristics of a steel, namely be composed principally of iron. As to the iron content, Professor Waterhouse (R., 24) testified as follows:

> I should say that a chromium-nickel steel alloy must contain at least fifty per cent of iron in order to deserve that name, because this is a steel that we have in mind, and a steel is primarily an iron alloy, so that I should say it must have at least fifty per cent of iron.

Austenitic, As Distinguished From Ferritic, Steel.

Iron exists in two simple forms, the *alpha* and the *gamma* (there is also a delta form which does not enter into the discussion of this case, R., 25).

In *alpha* iron, the atoms are arranged in the crystal space lattice in what is known as a *body centered* cube. Plaintiffs' Exhibit 2 is an atomic model which illustrates the arrangement of the atoms of iron in such *alpha* form. The arrangement is called "body-centered" because there is an atom at each corner of the cube, and *one* further *atom* in the *centre* of the cube. This arrangement of atoms is present in "ferritic" iron (R., 25).

In *gamma* iron, the arrangement of atoms is quite different. It is illustrated in the atomic model, Plaintiffs' Exhibit 3. This arrangement also has an atom at each corner of the cube, but *has no atom in the centre* of the body but, instead, *one atom* (six in all) *at the centre of each face of the cube.* This arrangement is therefore known as *"face centered"*.

In "austenite" or *austenitic steel,* the iron atoms are arranged in this *face centered* or *gamma* form (R., 25-26).

Pure iron exists at room temperature only in the *alpha* form, but at very high temperatures (900° C. and over) it has the *gamma* structure. When such iron is cooled, either slowly or suddenly from such temperature, it *reassumes* the *alpha* structure when it reaches lower temperatures, and there is no way known of making it retain

Metallurgical Division, being Chairman of the Advisory Committee of that particular Division. He was, and is now, connected as consulting metallurgist with the United States Bureau of Mines, and was recently appointed a member of the Advisory Committee for the whole Bureau. He has had a great deal of personal experience with austenitic chromium-nickel steels (R., 22-23).

Steel.

"Steel, as ordinarily understood, is an alloy of iron with carbon; and, just very generally speaking, we must have that combination of iron and carbon in order to have steel. The percentage of carbon varies from a very low percentage up to probably two per cent.; but, very broadly speaking, steel is an alloy of iron and carbon and owes its properties largely to the percentage of carbon and to the treatment that steel receives" (Waterhouse, R., 24).

Chromium.

Chromium is a metal which "is added to steel for a number of purposes". In connection with this invention, the important fact is "that chromium, when present in a sufficient amount, makes the steel resistant to corrosion so that * * * chromium makes the steel corrosion resistant" (Waterhouse, R., 24).

Chromium-Nickel Steel.

"A chromium-nickel steel is one containing both chromium and nickel, the chromium being there to confer resistance to corrosion and the nickel being there largely to confer ductility or workability to the steel" (Waterhouse, R., 24).

Iron Content.

A chromium-nickel steel is, of course, primarily a steel, and therefore must have the characteristics of a steel, namely be composed principally of iron. As to the iron content, Professor Waterhouse (R., 24) testified as follows:

> I should say that a chromium-nickel steel alloy must contain at least fifty per cent of iron in order to deserve that name, because this is a steel that we have in mind, and a steel is primarily an iron alloy, so that I should say it must have at least fifty per cent of iron.

Austenitic, As Distinguished From Ferritic, Steel.

Iron exists in two simple forms, the *alpha* and the *gamma* (there is also a delta form which does not enter into the discussion of this case, R., 25).

In *alpha* iron, the atoms are arranged in the crystal space lattice in what is known as a *body centered* cube. Plaintiffs' Exhibit 2 is an atomic model which illustrates the arrangement of the atoms of iron in such *alpha* form. The arrangement is called "body-centered" because there is an atom at each corner of the cube, and *one* further *atom* in the *centre* of the cube. This arrangement of atoms is present in "ferritic" iron (R., 25).

In *gamma* iron, the arrangement of atoms is quite different. It is illustrated in the atomic model, Plaintiffs' Exhibit 3. This arrangement also has an atom at each corner of the cube, but *has no atom in the centre* of the body but, instead, *one atom* (six in all) *at the centre of each face of the cube.* This arrangement is therefore known as *"face centered"*.

In "austenite" or *austenitic steel,* the iron atoms are arranged in this *face centered* or *gamma* form (R., 25-26).

Pure iron exists at room temperature only in the *alpha* form, but at very high temperatures (900° C. and over) it has the *gamma* structure. When such iron is cooled, either slowly or suddenly from such temperature, it *reassumes* the *alpha* structure when it reaches lower temperatures, and there is no way known of making it retain its gamma structure at room temperature except with the aid of one or more proper alloying ingredients. One of these alloying ingredients is nickel, which assists in retaining the gamma form (R., 26). Chromium does not (generally speaking) assist the iron to retain, upon cooling, its gamma or face centered structure but, on the contrary, seems to promote return to the alpha structure (R., 27). Generally speaking, therefore (at any rate, in so far as concerns chromium-nickel steels of the 18-8 type) the more chromium is used, the more nickel will have to be used in order to maintain the gamma structure at room temperature.

As shown by the ternary chart*, Plaintiffs' Exhibit 4 (R., 105) and the testimony of Professor Waterhouse relating thereto (R., 28, 29), a comparatively high nickel content compared with chromium content (field E) causes the iron to retain its gamma structure at room temperature, whereas with a comparatively high chromium content, even a high nickel content (field "ferritic") will not make it possible to keep the iron in the gamma form at such temperature. Between these two fields there lies a field, for convenience of explanation divided into two (C, D) alloys falling within which will have the iron substantially in the *alpha* form, *or* in the *gamma* form, *according to rapidity of cooling* (quenching). The presence of nickel renders the steel sluggish, in field E so sluggish that even the slowest cooling will not result in a conversion into the alpha form. In the intermediate field (C, D), if the cooling is rapid enough, the steel is too sluggish to become converted into the alpha form, but if the cooling is comparatively slow, the steel, or at least a substantial part of it, has time to become so converted.

The difference between the alpha (ferritic) and gamma (austenitic) forms of chromium-nickel steels is not merely of academic interest, but is of great practical importance. Chromium-nickel steels in the austenitic form are more ductile than those in the ferritic form. In the ferritic form the material "is much stiffer and harder to work" and therefore "there has been a great application of the austenitic type, which can be bent and formed and shaped much more readily—the difference being very largely in the increased ductility or formability of the austenitic steel" (R., 26).

---

*For the interpretation of a "ternary" chart, see below, p. 23.

Chemically Neutral.

The words "chemically neutral", in the first sentence of the Strauss original specification, refer to the fact that the austenitic chromium-nickel steel alloys are, generally speaking, resistant to chemical attack. With respect to *surface* corrosion, at any rate, the chromium-nickel steels (both austenitic and ferritic) have properties somewhat like those of the noble metals, such as gold and platinum, which resist the attack of a great many chemical agents (R., 30).

Other things being equal, both types of steel resist ordinary or *surface* corrosion about equally well (R., 26). There is, however, a great difference between them with respect to what is known as *intergranular* corrosion especially if the material has first been subjected to a temperature between 600° and 900° C. as, for instance, when being welded.

Intergranular Corrosion.

Intergranular corrosion, known also as intercrystalline corrosion, differs quite markedly from ordinary or surface corrosion. In fact, intergranular corrosion may take place without apparent surface corrosion.

In *ferritic* steels (alpha) *this intergranular corrosion does not take place* (R., 44). In spite of this fact, ferritic steels have not been found, generally speaking, suitable for the making of chemical reaction vessels, storage tanks, etc., because of the difficulty of working the ferritic metal.

In *austenitic* chromium-nickel steels this intergranular corrosion takes place when:

(a) they are heated to a temperature within the approximate range of 600° to 900° C. (R., 32); and

(b) simultaneously therewith, or subsequently, are subjected to the action of a corrosive liquid (R., 32).

For the sake of brevity, the range referred to under (a) will hereinafter be referred to as "deleterious range" or "carbide precipitation range".

What seems to happen is the following:

It is the chromium in the alloy which protects the steel against corrosion (R., 24). Whatever reduces the chromium content of the boundaries of the grain by robbing them of chromium, will permit the corrosive liquid to attack the exposed grains at their boundaries, corrode away the boundary material and thus gain access to grains formerly not exposed, and if these in turn have their boundaries robbed of chromium, will attack these, until it gradually works through the sheet of metal. The grains will eventually fall apart, and thus allow passage for the corrosive liquid, a leak results and the apparatus made of such steel is worthless (R., 36-37). See corrosion picture, Plaintiff's Exhibit 5, R., 109.

For picture illustrating crystal-growth see Plaintiff's Exhibit 10 (R., 117), for explanation thereof, see R., 38.

If the alloy is exposed to the deleterious range (*not* a higher one and *not* a lower one), the protective chromium at the boundaries of the crystal grains will unite with the carbon to form a chromium carbide, or a chromium-rich carbide, precipitating as such at the grain boundaries of the metal (R., 36). This formation of chromium carbide depletes the alloy along the grain boundaries of its chromium and thus the corrosive agent can begin its attack and continue its corrosive work as long as it finds chromium-poor material. This deleterious range is therefore a "carbide precipitation range" (of temperature).

This problem of intergranular corrosion does not exist if the austenitic material during its fabrication into vessels or other articles, or in use, is not raised in temperature to within the deleterious range; nor does it exist if the metal, after exposure to such deleterious range, is not subjected to a liquid corrosive agent. Nor does the problem arise when the material has not been exposed to the deleterious range for a substantial length of time, say one-half minute or more, but has merely cooled *rapidly* from a higher temperature *through the deleterious range,* down to below the lowermost limit of such range (as, for instance, in quenching) (R., 30-32).

This intergranular corrosion problem, in practice, has arisen mainly from welding together sections of the material to form a vessel or other structure, and then using the welded structure in contact with a corrosive liquid. As the alloy is expensive, its use has been limited substantially to the manufacture of vessels and other articles of comparatively thin sheets of metal united by welding. As the welding temperature is as high as the melting temperature of the alloy (certainly much higher than 900° C.) and as the material is thin, the cooling at the weld itself, and even close to the weld, from this high temperature, down *through,* and to *below,* the deleterious range, has been so rapid that the material was not held within such range long enough to cause chromium carbide formation (R., 31-32). However, at some distance from the weld (Pltff.'s Exh. 8, R., 113) along lines at each side thereof where, during the welding operation, the temperature was held within the deleterious range, intergranular corrosion did occur, and this was of so serious a kind as to make it almost entirely impracticable to use welded articles made of this alloy in connection with any liquid which acted corrosively, unless such articles had first been specifically treated (R., 31-32) as described hereinafter.

How Intergranular Corrosion Takes Place.

The kind of corrosion of which intergranular corrosion is a species, as distinguished from the "corrosion" which is produced merely by a direct chemical attack, is the result of electrolytic action necessitating (a) the presence of an electrolyte (corrosive liquid) and, (b) the presence of two substances of different electric potential (R., 37). The presence of a corroding gas would not produce "intergranular corrosion", although it might produce a direct chemical attack (R., 44). On the other hand, if an alloy is uniform in composition throughout, it will not have, in the presence of an electrolyte, two substances of different potential. The whole process of this type of corrosion is quite similar to that which takes place in a simple voltaic cell, or wet battery, or in a dry battery. An anode and cathode, both of zinc, or of copper, in the former, and a container and cathode in a dry battery, both of zinc or of copper, will never produce an electric current, and will never cause any corrosion or dissolution of anode or cathode (R., 38, Pltff.'s Exh. 9, R., 115).

Prior Art Solution of Problem.

Heat Treatment and Quenching: The only known method of preventing intergranular corrosion, was a comparatively simple one. Taking a welded article, made of an austenitic chromium-nickel steel—the entire welded article (having chromium carbide deposited along the grain boundaries, in zones parallel to the welding zone) was heated to a temperature of 1100°-1200° C., this resulting in a solution of the chromium carbides in the austenitic grains, thus restoring to the latter their normal chromium content, and then rapidly cooling the material, for instance, by quenching in water, so that it would quickly pass through the deleterious range (R., 31, 32).

The "sick" metal, suffering from deposits of chromium carbide, was thereby cured by the removal of such deposits, and the welded article could be used safely with a corrosive agent without suffering thereafter from intergranular corrosion (R., 32).

This solution not applicable to large articles: This was a perfect cure but, unfortunately, was not applicable to larger articles because it necessitated a reheating to a higher temperature, which would be impracticable with large articles and would cause such articles to become deformed, and it would be exceedingly difficult to find tanks large enough for quenching such large articles. The use of this cure was therefore, in practice, necessarily limited to small articles (R., 34).

By way of illustration: (Testimony of Heinrich Mueller, R., 54-58): During the year 1927 an order was received by the factory of the Krupp (Steel) Company, in Essen, Germany, for a large number of vats for storing beer, such vats to be made of austenitic chromium-nickel steel. The Krupp Company accepted the order, manufactured the vats and delivered them to the customer. The vats were made by uniting sections of the steel by welding (R., 55, 56). Although the acid in beer is a very weak one, complaint was received from the customer within three months after delivery, that the vats were leaking, and the Krupp Company was compelled to take back all of them at a great financial loss (R., 56). Dr. Strauss was at that time at the head of the Krupp Company laboratory, and he and his laboratory staff tried to find a solution for the problem. The staff, which had for years been actively associated in the pioneer work of producing such steels in large quantities for the market, could find no solution for the problem. The known solution (heating to about 1200° C and quenching) was inapplicable because the tanks were too large to be reheated to 1200° C., as they would thus have softened, and have collapsed by their own weight; and even if they could have been reheated, they would have been too large to be quickly quenched by dipping in water (R., 56).

Dr. Strauss Finds Solution of Problem.

Dr. Strauss then found the solution which is outlined in the claims in issue here. His solution, as will hereinafter be explained, was a very simple one, namely *to re-*

duce the carbon content to an extremely small proportion, namely from .1% or .12% (pp. 4-5 above) *to less than .07%.* Thereafter the Krupp Company recommended this low carbon steel for all uses for which the former steels were otherwise suitable, but which would involve raising and holding the temperature of any portion thereof to between 600° and 900° C. during a welding process. Large quantities of the modified steel were then marketed by the Krupp Company, in all from 15,000 to 20,000 tons, from about the middle of 1928 to the early part of 1936, substantially all for the purpose of building welded apparatus for use in containing corrosive liquids (R., 56). As the material is worth about $500 a ton, Dr. Strauss' solution of the problem made available, in Europe alone, from eight to ten million dollars worth of this steel for uses for which it would have been entirely unsuitable otherwise (R., 56).

The Invention in Issue.

The prior art solution of the problem was, as hereinabove explained (pp. 12-13) limited to comparatively small articles. When austenitic chromium-nickel steel was subjected to the "deleterious" or "carbide precipitation" range of temperature, it became *sick* by reason of the deposits of chromium carbide, and this sickness had to be *cured* by a high heat treatment, thus restoring the protective chromium to the grains, followed by a quenching.

It was Dr. Strauss' solution to reduce the carbon content of austenitic chromium-nickel steel (already very low—.1% or .12%, see pp. 4-5 hereinabove) to an extremely low figure, namely less than .07%. He found that by making this extreme reduction in the carbon content the steel would resist *intergranular* corrosion, even if it had been exposed to the "deleterious" or "carbide precipitation" temperature of 600° to 900° C. without being thereafter quenched. As he asserts (R., 65), the carbon remains dissolved, that is, does not form chromium carbide and therefore does not rob the grains of their protective chromium. As already shown hereinabove (p. 14) this was a solution of the problem which has worked in practice with thousands of tons of the low. carbon material.

This invention for the first time made it possible to build large articles by uniting sheets of austenitic chromium-nickel steel by welding.

This for the first time made it possible to build smaller articles, with the aid of the welding process, without the loss of time and labor, the increase in cost, and the danger of damage by distortion, theretofore involved in the reheating and quenching process (R., 42).

The Court below in its very brief opinion (or in its findings) did not rule on the question whether or not Dr. Strauss had made an invention or discovery. The Board of Appeals, however, distinctly did not base its decision on the ground that applicant had made no discovery. The Board not only stated that claims 25, 26 and 27 "go beyond the very critical conditions in relation to applicant's *discovery** in respect to proportions of constituents" (R., 100) but ended its opinion by the following extremely significant statement:

> *We do not contend that applicant has not made a true discovery in finding that if the carbon is maintained at extremely low percentages,* the objectionable peculiar corrodibility will not be developed in the range of temperature from 500 to 900° C. * * * (R., 100).*

The Board's Decision.

The Board of Appeals of the Patent Office, as already explained, expressly did not base its decision upon the ground that applicant had made no discovery. As the Board used the Constitutional and statutory word "discovery" ("securing * * * to * * * inventors the exclusive right to their * * * discoveries", Article 1, Sec. 8; "invention or *discovery''*, R. S. Secs. 4884, 4887), what the Board meant to say was that it did not deny ''invention'' although it denied ''patentable invention''. Authorities like Robinson (Vol. 1, Sec. 83) and Walker (6th Ed. Secs. 18, 60) say that ''discovery'' and ''invention'' are synonymous.

---

*Italics supplied.

The Board based its decision upon two premises. The *minor* premise (facts) was that the steels defined in the claims were shown to be old by certain three references (Smith, Everitt, and Terni). It indicated that this finding was based, not upon conviction as to the facts, but upon a failure of proof. It referred to applicant's argument that the claims call for *austenitic* steel, while the references do not disclose steel in the austenitic state. Although the Board had before it material (R., 93, 94) upon which it might well have found applicant's assertion to be correct, it said (italics supplied):

> We are not in a position to test steels to determine this point but believe *applicant has not furnished sufficient proof* to establish that the steels of the references would not be in this state which so far as can be determined would be true of their condition (R., 99).

The Board thus indicated that if it had come to the conclusion that the steels of the references were not austenitic, it might have held the claims patentable. It will hereafter be shown, on the basis of the expert testimony adduced at the trial, that the references do not disclose austenitic steels.

Even then the Board was forced to admit that the Strauss alloy was not disclosed in the references, except in what might be termed a ''marginal manner'', that is, that the references covered ranges which only at one of their ends overlap to a very slight degree the composition range of Dr. Strauss' alloy:

> We accordingly agree with the Examiner's conclusions that since the steel is anticipated as to com-

> position by the references even though *perhaps only by the end of the range of proportions* given in the references, * * * (R., 99). (Italics supplied.)

The fundamental *major* premise (law) applied by the Board, is a very surprising one, namely, that, the alloy being old, no one may receive a patent which involves the making of *any* kind of article of such alloy—thus apparently running counter to the many authoritative decisions sustaining invention, in the case of substitution of materials, when such substitution involves a discovery of an unsuspected characteristic of the material, especially when such substitution has solved a serious manufacturing problem (see further discussion pp. 39-47 of this brief):

> It is our opinion that the public is entitled to utilize the steels disclosed in the three references which anticipate applicant's proportions in manufacturing any desired articles thereof and that applicant is not entitled to claim monopoly on such articles (R., 100).

An additional, but subordinate, major premise (law) applied by the Board (also somewhat surprising in view of the many claims sustained by the courts because, and only because, of the *use* to which the product is to be put) is that the operation of the principle outlined in the first major premise, is not avoided by "attempting to distinguish them by supposed conditions to which they will be subjected in manufacture or use" (italics supplied):

> * * * but we are unable to agree that the appealed claims directed to articles formed of this material and accompanied with certain reference *to conditions of possible use* can be allowed where the steel as such is shown to be anticipated (R., 100).

As will hereinafter be shown (pp. 44-47) the Board, since it rendered its decision, on April 25, 1932, has taken an entirely different position with regard to these major premises, and *has deliberately allowed claims in this identical art, directed to the solution of the same problem, in terms almost identical with those of the claims here in issue, after ruling that the alloy itself was old.*

The Board held also that claims 25, 26, 27 and 28 are broader than the disclosure (R., 100).

Decision of the Court Below.

The decision of the court below is extremely brief. It was rendered immediately after the close of the trial, and adopts apparently the minor premise, and definitely the first major premise, of the Board:

> It does not seem to me that it is a patentable thing to claim that articles manufactured of austenitic steel cannot be made by anybody if they have less than .07 per cent. of carbon * * *. I do not think that those claims involved here represented a patentable invention (R., 59).

The Claims Here Sought.

25. Metal articles which in their normal use are subjected to active corrosive influences, while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher temperatures, said articles being resistant to said corrosive influences and composed of an austenitic chromium nickel steel alloy free from intercrystalline fractures and corrodible segregated carbide and containing iron, chromium, nickel, and carbon, the amount of carbon being not greater than 0.07%.

26. Metal articles which in their normal use are subjected to active corrosive influences, while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher

temperatures, said articles being resistant to said corrosive influences and composed of an austenitic chromium nickel steel alloy free from intercrystalline fractures and corrodible segregated carbide and containing iron, chromium, nickel, and carbon, the iron being in excess of each of the other ingredients, and the amount of carbon being not greater than 0.07%.

27. Metal articles which in their normal use are subjected to active corrosive influences, while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher temperatures, said articles being resistant to said corrosive influences and composed of an austenitic chromium nickel steel alloy free from intercrystalline fractures and corrodible segregated carbide and containing iron, chromium, nickel, and carbon, the iron being in excess of 50% and the amount of carbon being not greater than 0.07%.

28. Metal articles which in their normal use are subjected to active corrosive influences, while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher temperatures, said articles being resistant to said corrosive influences and composed of an austenitic chromium nickel steel alloy free from intercrystalline fractures and corrodible segregated carbide and containing iron as a major ingredient, more than 15% and less than 30% chromium, more than 5% and less than 15% of nickel and an amount of carbon not greater than 0.07%.

29. Metal articles which in their normal use are subjected to active corrosive influences, while the metal in at least a part of the article is in a condition resulting from welding or heating at ranges of approximately 600° to 900° C. without subsequent heating to substantially higher

temperatures, said articles being resistant to said corrosive influences and composed of an austenitic chromium nickel steel alloy free from intercrystalline fractures and corrodible segregated carbide and containing iron as a major ingredient, 18% to 25% of chromium, 7% to 12% of nickel, and an amount of carbon not greater than 0.07%.

Errors Relied Upon.

First: The Court erred in dismissing the bill of complaint and in not granting the relief therein prayed (Assg'ts. 1, 2—R., 17).

Second: The Court erred in holding that the claims in issue recite nothing patentable over the prior art, including the references (U. S. patent to Smith, No. 1,538,260, British patent to Everitt, No. 267,024, and French patent to Terni, No. 625,055); that the references show the steels disclosed by Dr. Strauss to be old, and the claims in issue to be anticipated, that therefore such claims are unpatentable, that such references disclose austenitic steels, to wit, the steels disclosed by Dr. Strauss, and disclose articles such as claimed (Assg'ts. 3, 4, 6, 7, 8, 11 and 12—R., 17, 18).

Third: The Court erred in holding that Dr. Strauss' application, as originally filed, described only an austenitic chromium-nickel steel alloy having a composition of chromium 18-25%, nickel 7-12%, carbon less than .07% and the remainder iron, and that claims 25, 26 and 27 are broader than the alleged discovery in that they specify no limits to the amount of chromium, nickel and iron, and that claim 28 specifies ranges of chromium and nickel not disclosed in the original application (Assg'ts. 5, 10 and 9—R., 17, 18).

Fourth: That the Court erred in holding that the steels are disclosed in the references, and that therefore no claim may be made for any articles made of such steels; and in refusing to hold that, whether or not the steels are old, certain articles, as claimed, made of such steels, are patentable (Assg'ts. 13, 14 and 15—R., 18).

Outline of Argument.

While applicant takes the position that it makes no difference whatsoever whether or not the references disclose austenitic steels or ferritic steels, it will first be shown that they do not disclose *austenitic* steels.

It will then be argued that, *whether or not* they disclose steels of the kind employed by applicant, applicant's claims are not directed to the steels but to a new application thereof in the use of certain metal articles, such application being based upon the discovery of an unsuspected characteristic of the steels.

In conclusion it will be argued that the claims are not subject to the objection of not defining the invention properly, and of being broader than the disclosure.

POINT I.

The references do not disclose austenitic chromium-nickel steels.

Attention is called at this time to the fact that there are no claims before this Court covering Dr. Strauss' steels *per se*, and that all the claims are limited to metal articles made of such steels. Attention is furthermore called to the fact that it is not argued that it was not known to experts prior to the filing of Dr. Strauss' application how ferritic steels could, if desired, be converted into austenitic steels. As already shown (p. 16), the Board of Appeals indicated in its decision that Dr. Strauss' invention might have been found patentable if the Board had been convinced that the references did not disclose austenitic steels. If they disclose ferritic steels, and not austenitic steels (two materials differing in important characteristics) it is clear that whatever was said in the references about the qualities, characteristics and uses of the ferritic steels did not necessarily disclose the characteristics, qualities and uses of austenitic steels of the same or similar composition, and therefore do not show a prior disclosure of the austenitic steels and their uses under the circumstances and conditions specified in the claims.

The Board of Appeals, and the Court below, considered three patent references, namely French patent to Terni, No. 625,055, British patent to Everitt, *et al.*, No. 267,024, and United States patent to Smith, No. 1,538,360. The ranges of the alloys of these three patent references are graphically shown on plaintiff's Exhibit 11 (R., 119).

As already shown (above p. 16), the Board of Appeals found (R., 99) that applicant had not furnished sufficient proof to establish that the three references considered by the Board (and later by the Court below) did not disclose austenitic steels, and indicated that the decision might have been favorable to the claims if it were convinced that the references do not disclose austenitic steels.

It is submitted that the testimony, adduced at the trial, clearly shows that the references disclose no *austenitic* steels. While the Patent Office rules do not permit the adducing of oral testimony with opportunity of cross-examination, and it is not surprising that the Board, in this difficult and rather new and unfamiliar art, was misled as to the facts, it did have before it evidence from which to draw the conclusion of fact upon which applicant insisted (R., 93, 94).

The Austenitic and Ferritic Field Chart.

As already explained hereinabove (pp. 7-9), an iron alloy is either austenitic or ferritic, that is, a particle of an alloy, and especially its iron content, has either the alpha (ferritic) atomic structure, or the gamma (austenitic) atomic structure, and there are marked differences between the alloys of these two structures, the ferritic being magnetic, hard, and difficult to draw, whereas the austenitic is non-magnetic, comparatively soft, and highly ductile, that is, comparatively easy to draw. It has been pointed out (pp. 8-9) that these qualities depend upon, or are functions of, the atomic arrangement, and that under ordinary conditions iron or its alloys are ferritic and not austenitic.

It has also been pointed out (p. 7) that at high temperatures (over 1000° C.) iron and its alloys are austenitic but, other things being equal, lose their austenitic nature and become ferritic as the temperature goes down towards room temperature.

It has also been pointed out (p. 8) that, generally speaking, a comparatively high proportion of nickel, and a comparatively low proportion of chromium, cause the alloy to retain its austenitic condition at room temperature, whereas when the nickel content is comparatively low, and the chromium content comparatively high, the alloy cannot, under any circumstances, be made to retain its austenitic character at lower ranges of temperature.

It has also been pointed out (p. 8) that between the ranges or fields of proportions in which the resulting alloy (at room temperature) is always austenitic, and that in which it never can become austenitic, invariably becoming ferritic, there lies an intermediate range of proportions, or field, within which the resulting product may be made substantially all austenitic, or contain a high proportion of ferritic material, according to whether or not the material is rapidly carried through the lower ranges of temperature, in other words, is quenched.

Plaintiff's Exhibit 4 (R., 105) is a *ternary* chart showing these fields. As the alloy contains three metals—nickel, chromium, and iron—whose proportions always total substantially 100%, a clear presentation of these and not austenitic steels (two materials differing in important characteristics) it is clear that whatever was said in the references about the qualities, characteristics and uses of the ferritic steels did not necessarily disclose the characteristics, qualities and uses of austenitic steels of the same or similar composition, and therefore do not show a prior disclosure of the austenitic steels and their uses under the circumstances and conditions specified in the claims.

The Board of Appeals, and the Court below, considered three patent references, namely French patent to Terni, No. 625,055, British patent to Everitt, *et al.*, No. 267,024, and United States patent to Smith, No. 1,538,360. The ranges of the alloys of these three patent references are graphically shown on plaintiff's Exhibit 11 (R., 119).

As already shown (above p. 16), the Board of Appeals found (R., 99) that applicant had not furnished sufficient proof to establish that the three references considered by the Board (and later by the Court below) did not disclose austenitic steels, and indicated that the decision might have been favorable to the claims if it were convinced that the references do not disclose austenitic steels.

It is submitted that the testimony, adduced at the trial, clearly shows that the references disclose no *austenitic* steels. While the Patent Office rules do not permit the adducing of oral testimony with opportunity of cross-examination, and it is not surprising that the Board, in this difficult and rather new and unfamiliar art, was misled as to the facts, it did have before it evidence from which to draw the conclusion of fact upon which applicant insisted (R., 93, 94).

The Austenitic and Ferritic Field Chart.

As already explained hereinabove (pp. 7-9), an iron alloy is either austenitic or ferritic, that is, a particle of an alloy, and especially its iron content, has either the alpha (ferritic) atomic structure, or the gamma (austenitic) atomic structure, and there are marked differences between the alloys of these two structures, the ferritic being magnetic, hard, and difficult to draw, whereas the austenitic is non-magnetic, comparatively soft, and highly ductile, that is, comparatively easy to draw. It has been pointed out (pp. 8-9) that these qualities depend upon, or are functions of, the atomic arrangement, and that under ordinary conditions iron or its alloys are ferritic and not austenitic.

It has also been pointed out (p. 7) that at high temperatures (over 1000° C.) iron and its alloys are austenitic but, other things being equal, lose their austenitic nature and become ferritic as the temperature goes down towards room temperature.

It has also been pointed out (p. 8) that, generally speaking, a comparatively high proportion of nickel, and a comparatively low proportion of chromium, cause the alloy to retain its austenitic condition at room temperature, whereas when the nickel content is comparatively low, and the chromium content comparatively high, the alloy cannot, under any circumstances, be made to retain its austenitic character at lower ranges of temperature.

It has also been pointed out (p. 8) that between the ranges or fields of proportions in which the resulting alloy (at room temperature) is always austenitic, and that in which it never can become austenitic, invariably becoming ferritic, there lies an intermediate range of proportions, or field, within which the resulting product may be made substantially all austenitic, or contain a high proportion of ferritic material, according to whether or not the material is rapidly carried through the lower ranges of temperature, in other words, is quenched.

Plaintiff's Exhibit 4 (R., 105) is a *ternary* chart showing these fields. As the alloy contains three metals—nickel, chromium, and iron—whose proportions always total substantially 100%, a clear presentation of these three fields is best shown on a triangular chart which shows the proportions of these three metals. Each leg, or base line, of the triangle represents zero per cent of the metal whose name is written at the opposite apex, and the apex point represents 100% of the metal. The composition of a steel (alloy) represented by any one point on the chart, can be read off by carrying the eye consecutively from each of the base or zero lines, up to the line parallel to such base which passes through such point. The total will always be 100%.

The subjoined sketch marked "Fig. 1; austenitic and ferritic fields" is made from Plaintiff's Exhibit 4, the lines indicating conditions at room temperature, the line dividing subsidiary fields C and D, being omitted, for the sake of clearness.

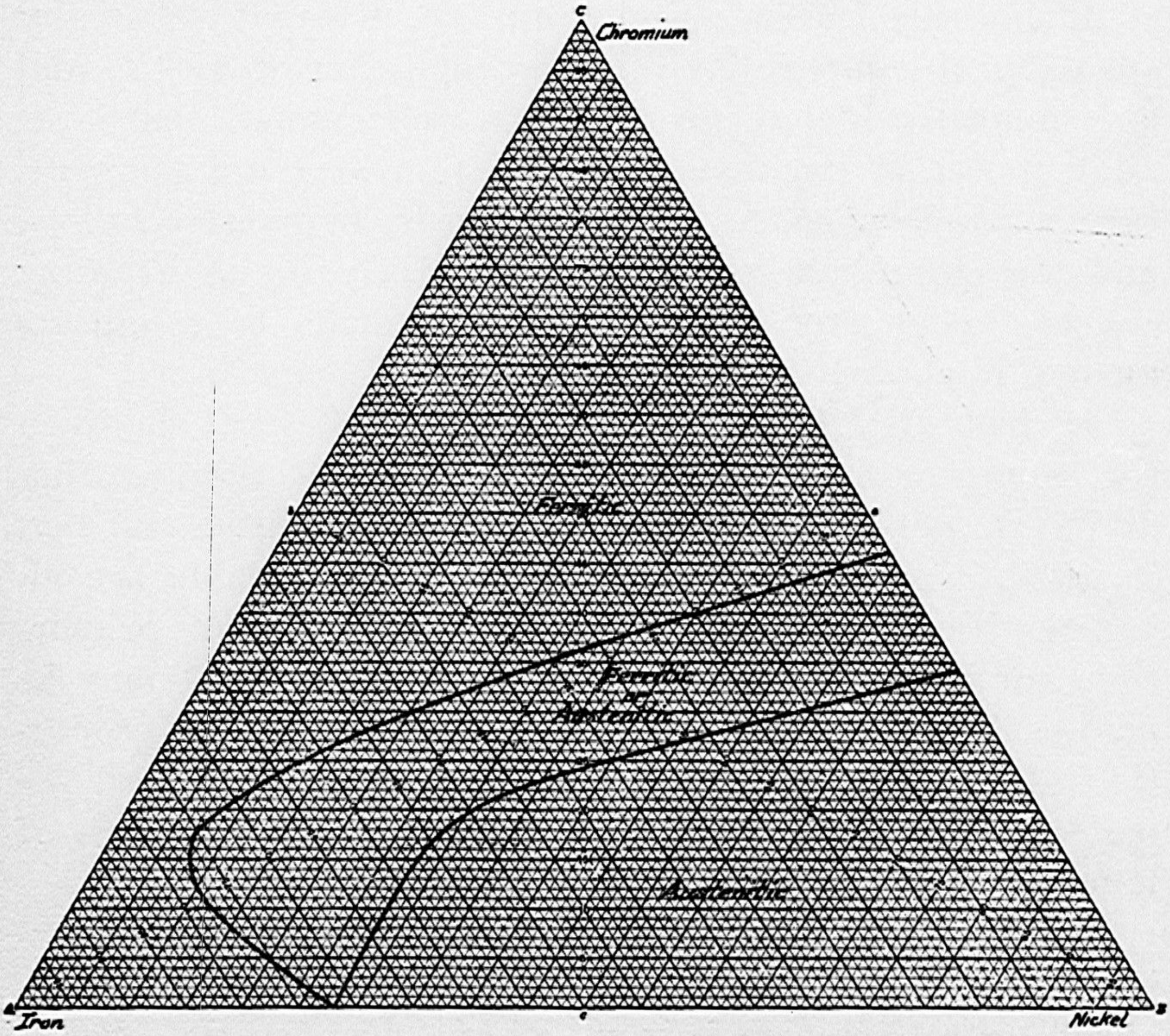

Fig. 1; Austenitic and Ferritic Fields.

In so far as the total proportions of the alloy are indicated by points within the upper or ferritic field, the alloy can never be anything but ferritic, at least at room temperature; in so far as they are indicated as falling within the lowermost field "austenitic", they can never be anything but austenitic; and, in so far as they fall within the intermediate field, "ferritic or austenitic", they are not austenitic, or at least preponderately austenitic, unless the alloy has been rapidly cooled (quenched) from a temperature in excess of 1000° C. The austenitic material referred to in the claims, as *clearly* understood by the court below, must be 100% austenitic (R., 53, bottom).

The fields C, D of Plaintiff's Exhibit 4 have been thrown into one in this sketch because the principle applying to both fields is the same. In field C it is necessary to do even more than to quench, namely to subject the heated material to forging or rolling, prior to quenching, in order to make the resulting product austenitic (R., 29).

Smith's U. S. Patent No. 1,538,360.

Discussion by Professor Waterhouse (R., 42-45), printed copy of patent (R., 121-123). (Italics supplied in quotations from testimony.)

The subjoined sketch, marked "Fig. 2, Smith Patent", is made from Plaintiff's Exhibit 11 (R., 119), and shows the specific example given by Smith and the range referred to in his patent.

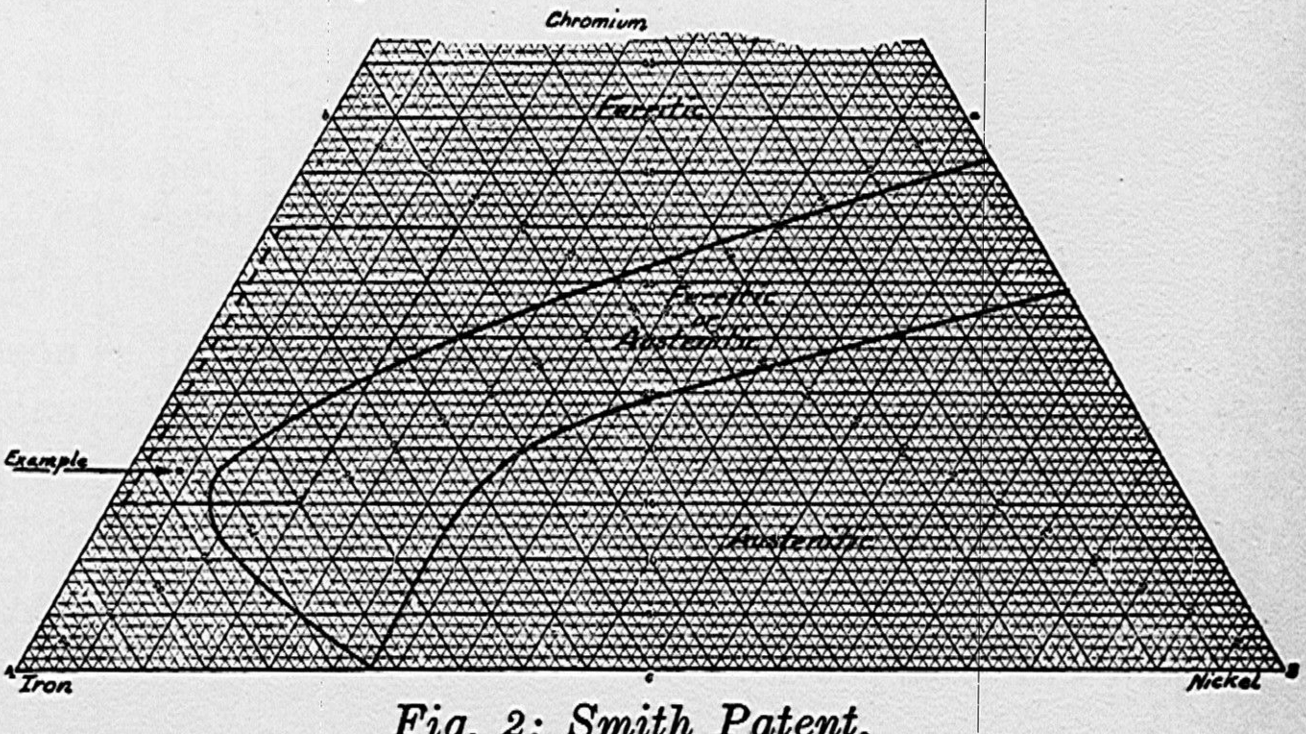

Fig. 2; Smith Patent.

Smith states that, in connection with his invention, he may use from 15% to 40% of chromium, and from 1% to 15% of nickel (R., 121, ll. 78-79). His statement with regard to a low carbon content, which caused his patent to be cited as a reference, is found at R., 122, ll. 45-50, and is to the effect that:

> When the alloy contains a low percentage of carbon, say .11 per cent to .12 per cent, the alloy is fairly malleable, and where the carbon is kept as low as 7/100 per cent to 8/100 per cent, the alloy is also easily machinable.

The question here to be discussed is whether or not Smith discloses an *austenitic* steel.

The reasons given by the Board of Appeals for reaching the conclusion that Smith discloses an austenitic alloy are given on page 99 of the Record:

> The patent to Smith likewise discloses a chromium-nickel steel wherein one extreme limit of his proportions falls upon the limit 0.07%, named by applicant as to carbon. Since Smith's steel may at its lower limit contain 0.07% and applicant's steel may contain, as stated in the claims, an amount not greater than 0.07% it follows that *Smith and applicant overlap as to the carbon on the single point of percentage 0.07%.*
>
> * * * Applicant contends that the references do not disclose steel in *austenitic* state and therefore that the references do not fully anticipate the claims. *We are not in a position to test steels to determine this point* but believe applicant has not furnished sufficient proof to establish that the steels of the references would not be in this state which so far as can be determined would be true of their condition. (Italics supplied.)

The testimony given by Professor Waterhouse now clearly establishes the fact (which the Board of Appeals said it could not find from the material available to it—R., 93, 94), that Smith does not disclose an austenitic steel.

As specific examples are inserted in a patent, or in other disclosures to metallurgists, for the purpose of illustrating the general type of product which the writer has in mind, it is advisable to consider first Smith's specific example, and then his broad statement as to range of proportions.

Smith's Specific Example.

Smith's specific example (R., 121, ll. 90-97), as indicated in Fig. 2, falls clearly within the *ferritic* field. Specifying only 4% nickel, it cannot render the material austenitic, more than 5% and, in fact, more than 6%, being necessary to make the resultant steel austenitic (R., 50); "his example falls very clearly within the ferritic field" (Waterhouse, R., 43).

Smith's So-Called Range.

Smith states that, in connection with his invention, he may use from 15% to 40% of chromium, and from 1% to 15% of nickel (R., 121, ll. 78-79), and this range is indicated in dotted lines on Fig. 2. It will be noted that: "The larger portion of the so-called range of the Smith patent falls into the *ferritic* field of this chart" (Waterhouse, R., 43), "assuming, however, that he is talking about material that falls over into the central field * * * *he says nothing about quenching* that material" (Waterhouse, R., 43).

Therefore, whatever may be the meaning of the so-called "range", it is clear that Smith does not disclose an *austenitic* steel.

What Does a Statement of "Range" Indicate?

Just what Smith meant by his statement of a range of chromium and nickel is a matter of no substantial importance, because, in so far as the range picture, or "lozenge", may overlie in part the central or "ferritic or austenitic'' field, he says nothing about quenching the material, or about making it austenitic. Nevertheless, for the purpose of a clearer understanding of what Smith really said, a brief discussion of the meaning of ''ranges'' is submitted.

In patents relating to compositions of matter, for instance alloys, it is customary to give at least one specific example of the composition, and also to indicate that the invention is not limited to this specific example, but may be embodied in compositions containing other proportions of the ingredients. In order to visualize such proportions, they are usually indicated, if the compound is binary, by means of a square or oblong figure, the one pair of parallel sides indicating the proportions of one ingredient, and the other pair of parallel sides the proportions of the other ingredient. With a ternary compound, a lozenge shaped figure is drawn on a ternary chart.

This method of visualizing the proportions, while helpful, frequently leads to a confusion of thought, and to a misunderstanding of what the ranges of proportions really mean. For instance, a typical example of a specific range of *austenitic* chromium nickel steels may be found in Dr. Strauss' application in suit (R., 65), 18% to 25% chromium, and 7% to 12% nickel. If these ranges are drawn on a ternary chart, the lozenge will extend far into the ferritic field, that is, the field in which the material could never be *austenitic*. Defendant's counsel caused Professor Waterhouse (R., 51) to indicate in pencil on Plaintiff's Exhibit 11 (R., 119), such a range (15% to 30% chromium, 5% to 15% nickel, specified in claim 28). In so far as the range lozenge extends into the ferritic field, it is entirely inapplicable, because if an application calls for an *austenitic* steel, it can never cover a ferritic steel no matter what the range may be. Obviously, therefore, the statement of ranges is only a general guide as to the field within which compositions of matter for instance, alloys having the desired properties, may be found. On this point Professor Waterhouse testified as follows (R., 43):

> Speaking from the standpoint of a metallurgist, when a man gives a specific example and then gives a large range, I should say that you have to read his patent carefully to decide *which of the alloys within that range he is really claiming.* He very obviously is not claiming all the alloys within that rectangular line. You have to pick up from his patent his *particular* alloy, that he proposes, that he describes; and I should say, as a metallurgist, to limit these alloys from these extreme ranges to the alloys *which will have the properties claimed.* (Italics suppied.)

Therefore, as Smith, in his specific example, discloses a *ferritic* steel, it might well be concluded that Smith intended to disclose and patent a ferritic steel. However, his specification leaves no doubt that he is speaking of ferritic, not austenitic, steels throughout.

Smith Does Not Disclose Austenitic Steels.

That Smith intended to describe a *ferritic* alloy and not an austenitic alloy, is clearly shown by Smith's specification (R., 121-3).

Thus at page 2, line 35 (R., 122), he says that his final alloy, "is very easily handled in the foundry and can be poured and cast in manner and by methods similar to those employed in foundry practice".

Professor Waterhouse points out (R., 43) that in the making of castings and in foundry work, "the materials are cooled *slowly* in the sand" (mold), which is the very opposite of quenching and would not make the material austenitic even if its proportions fell within the "ferritic or austenitic" (or intermediate) field.

Smith, with one exception, is silent with respect to the carbon content, which was, generally speaking, a quite immaterial consideration in connection with his invention. (The carbon proportion is not even mentioned in the claims.) The one exception is to be found at page 2, lines 45 to 52 (R., 122). He there says that when he uses "a low percentage of carbon, say .11 per cent. to .12 per cent., the alloy is fairly malleable" (here he is far beyond the "less than .07% carbon", proportion of Dr. Strauss). He continues "and where the carbon is kept as low as 7/100 per cent to 8/100 per cent, the alloy is also easily machinable".

It was this "7/100 per cent of carbon" which the Examiner seized upon to show that Smith disclosed an alloy which was the same as one of the alloys disclosed by Dr. Strauss. This .07% of carbon was the lowermost limit of Smith's range, whereas it is the uppermost limit of Dr. Strauss' range (Dr. Strauss really said "*less* than 0.07 per cent."—R., 65, see above, pp. 3-4).

Attention is called to the fact that Smith, *in order to make his alloy easily machinable* suggests that the carbon content be kept down to .07% or .08%.

Keeping in mind that the question is whether or not Smith discloses an austenitic steel with a carbon content as low as .07%, or a ferritic steel with such a low carbon content, the question arises whether this reduction increases the machinability of ferritic steel or of austenitic steel, or of both.

Professor Waterhouse testified that the reduction of carbon increases the ease of machining of ferritic chromium nickel steels, whereas with austenitic chromium-nickel steels reduction of the carbon does not greatly change the ease of machining. As this question of austenitic vs. ferritic, arising with respect to all three of the references, is so clearly illuminated by the fact just mentioned, the testimony of Professor Waterhouse on this point is here more particularly referred to.

Professor Waterhouse gave (R., 43) two definitions of "easily machinable", namely (1) "the ability to remove metal easily from a bar in a lathe or a piece of steel in a shaper; in other words, that it is soft and can easily be machined" (R., 43); and (2) it can be cut with a clean thread (R., 44). In the first sense, the lower carbon steels, generally speaking, machine better than the higher carbon steels if ferritic, but *not* if austenitic, and, in the second sense, such lower carbon steels do *not* machine better if austenitic:

> In ferritic chromium-nickel steels, the effect of reducing the carbon is that it increases the ease of machining. In the austenitic chromium-nickel steels, in general, the reduction of the carbon does not greatly change the ease of machining. I am speaking from the first aspect that I have been talking about * * *. From the second standpoint, of getting a clean cut, the reduction of carbon does not improve machinability in the austenitic field (Waterhouse, R., 44).

From this, Professor Waterhouse draws the following conclusion:

> I conclude that Smith was talking about the *ferritic* type of steel (R., 44).

Professor Waterhouse then testified that Smith says nothing about intergranular corrosion, and that this is not a problem with ferritic steel, and that he in no way suggests the intergranular corrosion problem and the solution discussed in Dr. Strauss' application (R., 44).

Referring to what Smith says at page 1, lines 42 to 64, of using his alloys for various purposes, such as heat treating boxes, saggers, furnace parts and crucibles, all of them being containers which are exposed to furnace gases (see also p. 2, ll. 65-6), Professor Waterhouse testified that there can be no intergranular corrosion because there is no electrolyte, *i. e.,* no liquid corroding agent, present.

It would therefore seem clear that Smith does not disclose an austenitic steel (with regard to which there is a problem of intergranular corrosion) but discloses a ferritic steel (with regard to which there is *no* problem of intergranular corrosion). Smith says nothing about making his steel austenitic, for instance, he says nothing about quenching it. He had certainly not made applicant's dis-

"a low percentage of carbon, say .11 per cent. to .12 per cent., the alloy is fairly malleable" (here he is far beyond the "less than .07% carbon", proportion of Dr. Strauss). He continues "and where the carbon is kept as low as 7/100 per cent to 8/100 per cent, the alloy is also easily machinable".

It was this "7/100 per cent of carbon" which the Examiner seized upon to show that Smith disclosed an alloy which was the same as one of the alloys disclosed by Dr. Strauss. This .07% of carbon was the lowermost limit of Smith's range, whereas it is the uppermost limit of Dr. Strauss' range (Dr. Strauss really said "*less* than 0.07 per cent."—R., 65, see above, pp. 3-4).

Attention is called to the fact that Smith, *in order to make his alloy easily machinable* suggests that the carbon content be kept down to .07% or .08%.

Keeping in mind that the question is whether or not Smith discloses an austenitic steel with a carbon content as low as .07%, or a ferritic steel with such a low carbon content, the question arises whether this reduction increases the machinability of ferritic steel or of austenitic steel, or of both.

Professor Waterhouse testified that the reduction of carbon increases the ease of machining of ferritic chromium nickel steels, whereas with austenitic chromium-nickel steels reduction of the carbon does not greatly change the ease of machining. As this question of austenitic vs. ferritic, arising with respect to all three of the references, is so clearly illuminated by the fact just mentioned, the testimony of Professor Waterhouse on this point is here more particularly referred to.

Professor Waterhouse gave (R., 43) two definitions of "easily machinable", namely (1) "the ability to remove metal easily from a bar in a lathe or a piece of steel in a shaper; in other words, that it is soft and can easily be machined" (R., 43); and (2) it can be cut with a clean thread (R., 44). In the first sense, the lower carbon steels, generally speaking, machine better than the higher carbon steels if ferritic, but *not* if austenitic, and, in the second sense, such lower carbon steels do *not* machine better if austenitic:

> In ferritic chromium-nickel steels, the effect of reducing the carbon is that it increases the ease of machining. In the austenitic chromium-nickel steels, in general, the reduction of the carbon does not greatly change the ease of machining. I am speaking from the first aspect that I have been talking about * * *. From the second standpoint, of getting a clean cut, the reduction of carbon does not improve machinability in the austenitic field (Waterhouse, R., 44).

From this, Professor Waterhouse draws the following conclusion:

> I conclude that Smith was talking about the *ferritic* type of steel (R., 44).

Professor Waterhouse then testified that Smith says nothing about intergranular corrosion, and that this is not a problem with ferritic steel, and that he in no way suggests the intergranular corrosion problem and the solution discussed in Dr. Strauss' application (R., 44).

Referring to what Smith says at page 1, lines 42 to 64, of using his alloys for various purposes, such as heat treating boxes, saggers, furnace parts and crucibles, all of them being containers which are exposed to furnace gases (see also p. 2, ll. 65-6), Professor Waterhouse testified that there can be no intergranular corrosion because there is no electrolyte, *i. e.,* no liquid corroding agent, present.

It would therefore seem clear that Smith does not disclose an austenitic steel (with regard to which there is a problem of intergranular corrosion) but discloses a ferritic steel (with regard to which there is *no* problem of intergranular corrosion). Smith says nothing about making his steel austenitic, for instance, he says nothing about quenching it. He had certainly not made applicant's discovery. The claims as presented to the Board of Appeals, as respects carbon content, overlap, as the Board said, "only at their ends". Unfortunately the clerical error referred to, which crept in at the very beginning of the prosecution of the application, failed to make it clear that Dr. Strauss, even as to carbon content, disclosed a range "less than" the lowermost range referred to by Smith.

In any event, the opinion of the Board (R., 99, bottom) would seem clearly to indicate that Dr. Strauss' invention would have been regarded as patentable if the Board had been convinced that Smith disclosed a ferritic, and did not disclose an austenitic, steel.

Terni, French Patent No. 625,055 of 1927.

Discussion by Professor Waterhouse (R., 45). Translation of patent (R., 126-128).

The subjoined sketch marked "Fig. 3, Terni patent", is made from Plaintiff's Exhibit 11 (R., 119), and shows the specific example given by Terni, and the range referred to in his patent. This patent discloses the use of alloys containing from 7% to 25% of chromium, .05% to 20% of nickel, .05% to 1.5% of carbon, the remainder, except for some silicon and manganese, and possibly slight additions of tungsten, molybdenum or vanadium, being substantially iron.

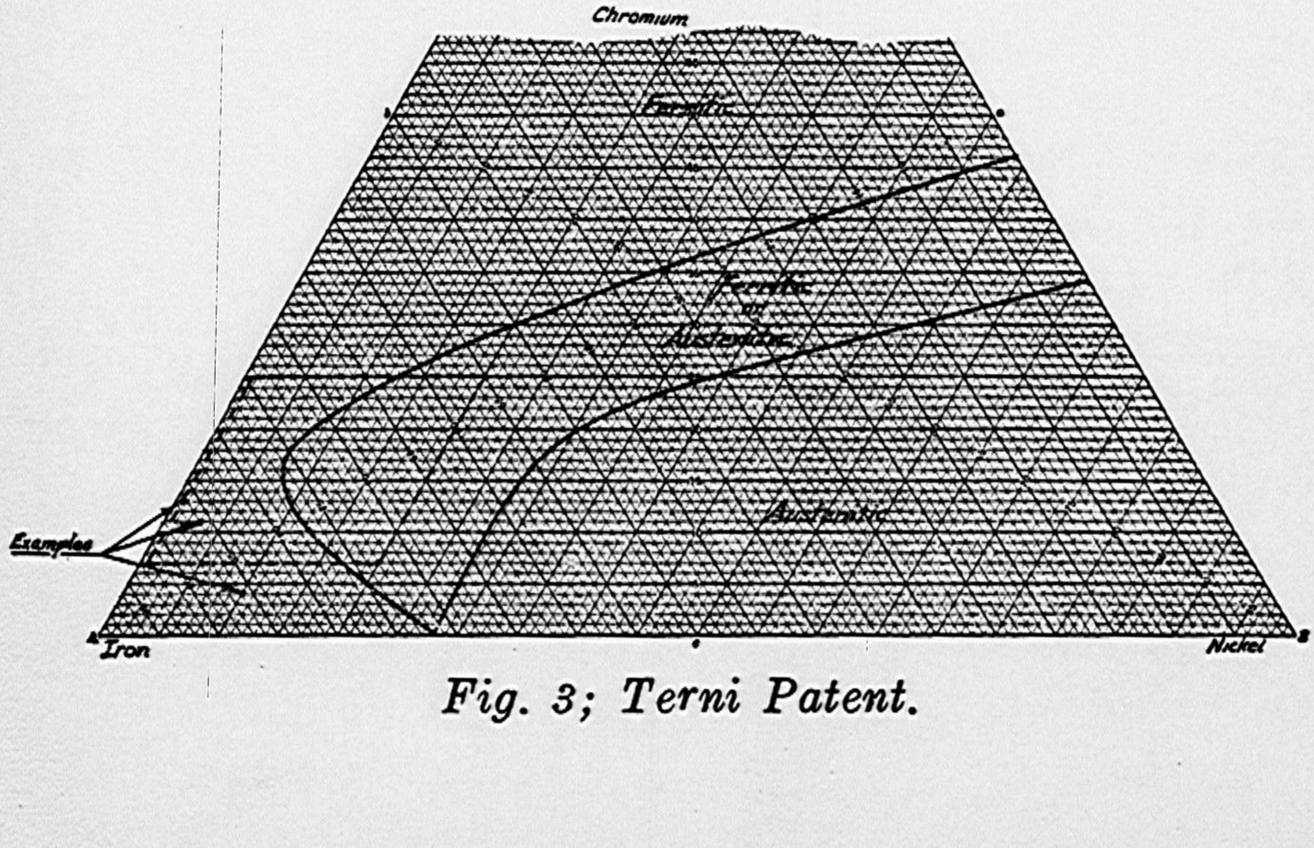

Fig. 3; Terni Patent.

As shown by the sketch, Fig. 3, all of the specific examples given by Terni are within the ferritic field and therefore could not possibly have been made austenitic. One of the examples is even outside of the range specified by Terni.

For reasons explained hereinabove (pp. 28-29) it should be clear that Terni intended to indicate that his invention related to a *ferritic* steel. His specific examples lie within the ferritic field. He says nothing about quenching, or making the material austenitic; he says nothing about welding the material, or otherwise heating it to within the deleterious temperature range and then quenching it; he says nothing about the problem of intergranular corrosion. He had no particular reason for making his material austenitic as he was working with turbine blades and other parts, most of which are necessarily built for strength, which fact alone would show that the softer, or more ductile, austenitic steel would be entirely unsuitable.

The Board of Appeals held (R., 99) that the Terni patent discloses "certain ranges of the constituents of chromium-nickel steel with respect to chromium-nickel and carbon. Some of these examples come within applicant's range of proportions", and it concluded (R., 99), just as it did with respect to the Smith patent, that as it was not in a position to test steels, it had to assume from the composition of Terni's steel that it must be austenitic.

It has been shown hereinabove (p. 25) that in so far as Terni's range falls into the "ferritic" field, it cannot possibly disclose an austenitic material, and that in so far as it falls within the "ferritic or austenitic" field, it cannot be substantially austenitic unless made so by rapid cooling (quenching). It is this important fact which the Board of Appeals did not recognize.

Everitt British Patent No. 267,024 of 1927.

Discussion by Professor Waterhouse (R., 45). Copy of patent (R., 125-126).

The subjoined sketch, marked "Fig. 4, Everitt patent", is made from Plaintiff's Exhibit 11 (R., 119) and shows the specific example, or, rather, example *series,* disclosed by Everitt.

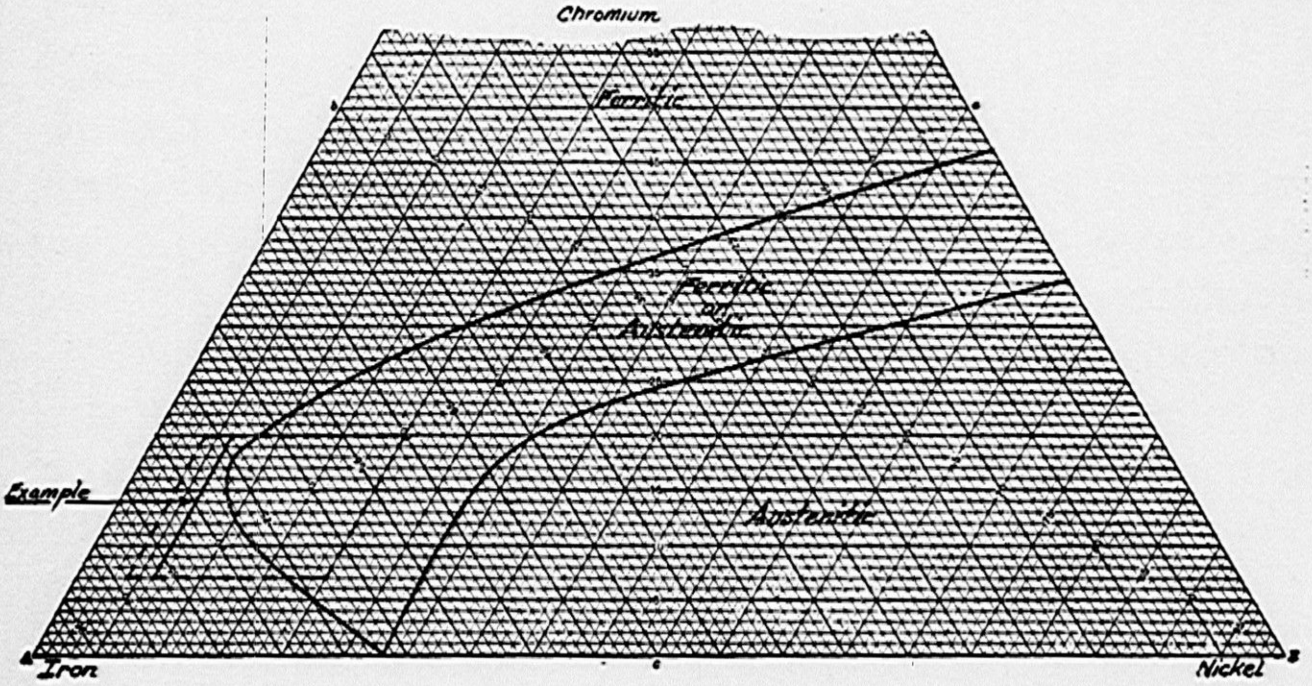

Fig. 4; Everitt Patent.

Everitt discloses a range of from 7% to 24% chromium, and 7% to 20% of nickel. His specific example (R., 126) includes 6% of nickel and from 7% to 20% of chromium. This example can, therefore, not be represented by a single dot, but only by a line, indicating 6% nickel, and extending from 7% to 20% chromium. His carbon content is "between 0.05 to 0.5 per cent" (R., 126).

Everitt's specific examples are all in the ferritic field and, as explained hereinabove (pp. 28-29) it should therefore be presumed that his invention relates to a ferritic steel. Everitt says nothing about quenching his material or making it austenitic, and says nothing about the problem of intergranular corrosion. While he mentions a broad range of carbon he gives no indication as to why, and when, one or the other proportion should be used.

The Board of Appeals held (R., 99) that Everitt discloses ranges which fall within applicant's range of proportions, and that as the Board could not test the Everitt steel, it assumed that it constituted an austenitic steel.

As has been shown hereinabove (pp. 28-29) and in the discussion of the Smith and Terni patents (pp. 27, 33), that, in so far as Everitt's range lozenge falls into the ferritic field (as do all his specific examples) his steel could not possibly be austenitic, and that in so far as it falls within the "ferritic and austenitic" field, he said nothing about quenching. Reference is again made to the fact that the decision of the Board indicates that, if it had been convinced that Everitt did not disclose an austenitic steel, it might have regarded the Strauss invention as patentable.

Conclusion.

The steels of the specific examples given in the three references all fall within the ferritic field, and could never have been made austenitic, and presumably, therefore, the patentees intended to indicate that their steels are to be ferritic. Ranges extending into the intermediate field, "ferritic or austenitic", in so far as they mean anything, mean that the steels would be left ferritic, because nothing is said about quenching or otherwise making them austenitic. The references do not discuss the problem of intergranular corrosion.

That the court below, and the Solicitor of the Patent Office, were not convinced that these three references disclose an austenitic steel, seems clearly indicated by Findings of Fact 5, 6, and 7 (R., 14-15) which recite the disclosures of the patents, but do not recite that the references disclose *austenitic* steels. That this could not have been a mere oversight is shown by the fact that Finding No. 1, line 4, sets forth that the claims in issue relate to austenitic steels, and that Finding No. 2, line 1, refers to austenitic chromium nickel steels as being broadly old.

To be sure, Finding No. 4 (R., 14) recites that the steels disclosed in plaintiff's application "are shown to be old in the references cited", but this Finding seems to be merely a summary of, or conclusion drawn from, Finding No. 3, which gives parallel tables of the ranges of the references, and of the Strauss application, but is silent with respect to any austenitic character of the steels of the references.

The Board of Appeals indicated very strongly in its opinion that it might not have denied patentability to Dr. Strauss' invention if it had been proven, to the Board's satisfaction, that these three references did not disclose austenitic steels. The Board said:

> Applicant contends that the references do not disclose steel in austenitic state and therefore that the references do not fully anticipate the claims. We are not in a position to test steels to determine this point but believe *applicant has not furnished sufficient proof to establish that the steels of the references would not be in this state which so far as can be determined, would be true of their condition. We accordingly agree with the Examiner's conclusions* that since the steel is anticipated as to composition by the references even though perhaps only by the end of the range of proportions given in the references, patentability is not involved in forming articles of this steel and attempting to distinguish them by supposed conditions to which they will be subjected in manufacture or use (R., 99-100). (Italics supplied.)

It will be argued hereinafter, under POINT II, that from the standpoint of patentability it would make no difference whatsoever whether or not the references disclosed austenitic steels. However, for the present it suffices to point out that the fundamental reason, given by the Board for its rejection of the claims, is that the Board was not convinced that the references failed to disclose austenitic steels. Professor Waterhouse's testimony establishes convincingly that they do not disclose such steels.

Obviously, if the references do not disclose austenitic steels, their steels did not involve the intergranular corrosion problem (above, p. 9) and what they say about the qualities of their steels cannot be assumed to relate to austenitic steels or to intergranular corrosion.

POINT II.

Whether or not Dr. Strauss' steels (alloys) were anticipated his invention is patentable.

It has been shown, under Point I, that the steels of which Dr. Strauss makes the particularly claimed metal articles are not disclosed by the references.

It will now be shown that, *whether or not the steels employed by Dr. Strauss were known,* his invention as claimed is patentable.

For the purpose of this argument, it may be *assumed* (although the contrary is the fact) that Dr. Strauss' steels (austenitic chromium nickel steels containing *less than .07% of carbon*) are disclosed in the references.

Dr. Strauss Made a Discovery.

As to one matter there is apparently no dispute whatsoever in this case, namely that Dr. Strauss made a discovery. Not only did the Board of Appeals speak of "applicant's *discovery*" (R., 100, l. 17), but it distinctly stated (R., 100) that:

> *We do not contend that applicant has not made a true discovery* in finding that if the carbon is maintained at extremely low percentages, the objectionable peculiar corrodibility will not be developed in the range of temperature from 500 to 900° C. (Italics supplied.)

The Court below, in its Findings of Fact and its Conclusions of Law, does not specifically touch upon this question of discovery.

There is nothing whatsoever in any of the references or other exhibits, offered by defendant, to show that it was known that intergranular corrosion can be prevented without going through the difficult, expensive and, with larger articles, impossible, process of reheating to a very high temperature and then quenching.

As shown by the testimony (R., 40, 56) this discovery has made it possible to use, in connection with exposure to corrosives, articles made of austenitic chromium nickel steel, if such articles, during the process of bending, welding, or for any other reason, have to be subjected to the deleterious range of temperature (carbide precipitation range of temperature—600-900° C.) without reheating and quenching them.

Decisions Below as to Patentability of Substitution of Materials.

The Court below, in its Opinion and in its Conclusions of Law, apparently followed the ruling of the Board of Appeals which is in the following language:

> It is our opinion that the public is entitled to utilize the steels disclosed in the three references which anticipate applicant's proportions in manufacturing any desired articles thereof and that applicant is not entitled to claim monopoly on such articles (R. 100).

It will be shown that this statement of law is in direct conflict with the authorities, and that the Board of Appeals itself, in an exactly parallel case, involving the same problem but a different solution thereof, ruled to the contrary effect.

Assuming (what is in fact here denied), that Dr. Strauss' steels are disclosed by the references, the fundamental question of law is *whether there is patentable invention in discovering that out of the many available steels this particular steel had a property which no one heretofore had suspected,* namely that of resisting intergranular corrosion when heated within the carbide precipitation range, without reheating and quenching (curing), and ascertaining also that this steel could be substituted for other steels (for instance, austenitic chromium nickel steel containing more than .07% carbon) in vessels or other articles subjected to the carbide precipitation range temperature, and then to a corrosive medium, without first reheating and quenching.

Substitution of Materials—the Law.

The law on this subject has been fully developed over fifty years ago, and the Courts have not departed from the principles then established. The following quotations from *Merwin, Patentability of Inventions* (a truly scholarly work) are given. not as authority, but as merely introductory to the authorities to be hereinafter referred to. (Italics supplied):

> * * *. It is true also, of course, that *the substitution* of a newly discovered substance, or *of a substance* or article of any sort *in which a new property has been discovered,* is always patentable (p. 493).
>
> If the discoverer of a principle makes a practical application of it, and describes the application, he may obtain a valid patent. For instance, *the discoverer* of a new metal or *of some new, that is, unknown, property in a known metal,* would be entitled to a patent *if he made a practical application of his discovery* (p. 55).

The leading case bearing upon the patentability of a substitution of material, based upon the practical application of a discovery of a new property of such material (exactly as here), seems to be *LeRoy* v. *Tatham,* 14 How. 156, decided in 1852:

> A new property discovered in matter, when practically applied, in the construction of a useful article of commerce or manufacture, is patentable (p. 175).

The Supreme Court of the United States expressed itself very clearly on this proposition of law in at least two other decisions (italics supplied).

> *Hicks* v. *Kelsey,* 18 Wall. 670, 673:
>
> The use of one material instead of another in constructing a known machine, is, in most cases, so obviously a matter of mere mechanical judgment, and not of invention, that it cannot be called an invention *unless some new and useful result, an increase of efficiency, or a decided saving in the operation, is clearly attained.*
>
> *Smith* v. *Goodyear,* 93 U. S. 486, 494, 495:
>
> (Patent was for hard rubber plate for artificial teeth.)
>
> It is evident this is much more than employing hard rubber to perform the functions that had been performed by other materials, such as gold, silver, tin, platinum or gutta-percha. A new product was the result, differing from all that had preceded it, not merely in degree of usefulness and excellence, but differing in kind, having new uses and properties. It was capable of being perfectly fitted, * * *. All this is sufficient, we think, to justify the inference that *what Cummings accomplished was more than a substitution of one material for another; more than the exercise of mechanical judgment and taste,—that it was in truth invention.*

This Court in *In re Harbeck,* 39 App. D. C. 555, held as follows:

> While the use of new materials to produce a known result, or of known materials to produce a new but obvious result, may not always constitute invention, if the new idea, when applied, brings success out of failure, produces a new and useful result and saving in operation or production, or efficiency instead of inefficiency, gives to the device new functions and useful properties, it is invention, and may be patented.

In *Remington* v. *Acme,* 71 Fed. (2d) 628, the Circuit Court of Appeals for the Fourth Circuit, summarized the law on this point as follows:

> There is, however, no rule of law that the substitution of a new material for an old is not patent-

> able. The question is always whether the alteration requires invention or merely the exercise of mechanical skill and judgment. The answer must be found in the light of the circumstances of the particular case, although decisions of the courts are helpful which attempt to summarize the facts of prior cases and to formulate general rules based thereon. (Citing cases, p. 632.)

A decision of particular interest in this connection, because it bears upon the substitution of a well known alloy for other alloys in an extremely simple article (coil of wire to serve as an electric resistance unit) is *General Electric Co.* v. *Hoskins Mfg. Co.*, 224 Fed. 464, decided by the Circuit Court of Appeals for the 7th Circuit. In this case one Marsh had obtained a patent for his discovery that an old and known alloy, consisting of about 50% chromium and 50% nickel, had a very long life when used as a resistance element, that is, the heating element in electrical toasters, heaters, ironers, etc. Electrical resistance units made of platinum were old. Marsh claimed an electric resistance element composed of the cited proportions of chromium and nickel. As the Court said in its statement of the facts (p. 464), "what the patentee claims is a new use of an old material". The Court, after finding that Marsh had solved a real problem, ruled as follows:

> That Marsh was entitled to a patent for the service he rendered in rescuing the alloy from obscurity and placing it in the forefront of electrical resistance elements seems clear under the authorities. He first disclosed the properties and great advantages of the chromium-nickel alloy as a resistance element (p. 471).

It is respectfully submitted that this case is parallel to the instant case in many respects, if it be assumed that the three references cited by the Board of Appeals disclose the steels described by Dr. Strauss. Marsh took an alloy described in prior patents, as it is assumed that

Dr. Strauss did. Marsh used a known coil of wire (electric resistance unit), and Dr. Strauss used any one of a number of chemical vessels or apparatus parts of known forms. Marsh discovered that the old alloy had peculiarly valuable properties which made it suitable for use in a resistance element; and Dr. Strauss found that the steels (asserted to be old) had peculiar advantages when used in chemical vessels, parts, etc. Each had made a true discovery and had utilized it in making something of practical value in the arts. Marsh's simple contrivance became successful in the electric heating art, and Dr. Strauss' simple contrivance has proven itself very useful in the chemical apparatus, etc., art.

The following brief references to other decisions will illustrate how this general principle has been applied in other arts:

In *American Sulphite* v. *Howland,* 80 F. 395, and in *Munising* v. *American Sulphite Co.,* 228 F. 700, the Circuit Courts of Appeals for the First and Fourth Circuits, respectively, upheld a patent in which a lining of cement (itself well known) was substituted for a lining of brick or of sheet lead, in a sulphite digester.

In *George Frost* v. *Cohn,* 119 F. 505, the Circuit Court of Appeals for the Second Circuit sustained a patent showing a well known hose supporter in which a rubber button was substituted for the known metal button.

In Westmoreland v. *Hogan,* 167 F. 327, the Circuit Court of Appeals for the Third Circuit sustained a patent for a salt dredge, or shaker, in which a celluloid top had been substituted for the ordinary metal top.

The tribunal which has to consider questions of patentability more frequently than any other single tribunal is the Board of Appeals of the Patent Office. In view of the great experience of this tribunal, the care with which it considers its decisions, and the great respect which it enjoys among patent lawyers, would make it quite unnecessary to apologize to this Court for citing its decisions.

However, the primary reason for referring to the following decisions of the Board of Appeals, all of them rendered within very recent years, is to show that in the instant case the Board departed from the well established rule, which it itself recognizes as valid, namely that substitution of material is patentable when an inventor has made a discovery of a hitherto unknown property of a material, and has utilized this discovery in making an advance in an art.

Attention is called to the fact that these decisions were all rendered by the Board of Appeals after April 25, 1932, when it rendered its decision in the instant case (R., 103):

Ex parte Fulweiler & Jordan, 24 U. S. Pat. Q., 268 (June 14, 1934): The invention related to a gas meter diaphragm made of leather stuffed with an aluminum soap of cocoanut oil. The applicants admitted that the leather was old, but argued that the references did not indicate "that the leather will resist drip oil from gas or is especially adapted for use in forming the diaphragms of gas meters". The Board of Appeals held:

> It is our opinion that appellants have discovered new properties in this material especially adapting it for use in gas meters. This case is believed to be similar to that of *Ex parte Brown*, 1929 C. D. 85 which contains the statement:
>
> "Appellant appears to have been the first to discover that this material possesses unexpectedly superior electric insulating properties. For this reason we think appellant's discovery patentable."
>
> In our opinion appellants have made an invention or discovery entitling them to patentable recognition and the decision of the Examiner is accordingly reversed.

Ex parte Weiger, 26 U. S. Pat. Q. 25 (Nov. 7, 1934): Applicant claimed a valve seat, made of a certain material, designed for use with poppet valves in an internal combustion engine. As said by the Board:

> The only alleged novelty of the claims resides in the use of the material for the seat not heretofore used for that purpose.
>
> The material itself is disclosed in the patent to Sieger and appellant but this patent does not describe to any extent the properties of the material.

Here the applicant was rejected on one of his own earlier patents which disclosed the material. After a prolonged discussion of the peculiar problems arising in the use of valve seats in internal combustion engines, and discussing a number of other references, the Board allowed the patent on the ground that:

> There is no teaching with respect to the properties of such alloys which would make it obvious to use the same for the manufacture of valve seats.

Ex parte Lohrs, 28 U. S. Pat. Q., 550 (Aug. 7, 1935): Here the applicant claimed, as part of a lock, a bolt having an insert of lignum-vitae impregnated with oil. Inserts for lock bolts were known, and lignum-vitae was known as suitable for bearing surfaces. The Board allowed the patent, saying:

> Ordinarily, the substitution of a superior material for an inferior one does not amount to invention, especially where the substitution does not involve the discovery of new properties in the material substituted. Where, as here, however, the substitution seems to have produced a material advance in the art which was not obvious, we think a patent may be properly granted.

The most persuasive decision of the Board of Appeals is one rendered in the Interference No. 67,408, *Becket &*

Franks v. *Schafmeister*, still pending in the Patent Office.* This decision was rendered October 15, 1935. The invention in issue had to do with the identical problem involved in the instant case, namely the prevention of intergranular corrosion in austenitic chromium-nickel steels. The solution of the problem (much later than that of Dr. Strauss) was not to reduce the carbon content, but to use the usual, and therefore higher, proportion of carbon, and then to tie up the carbon by means of columbium or tantalum, or both, thus making it impossible for the carbon to rob the grains of chromium. One of the parties had moved to add Counts to the interference, covering the austenitic chromium-nickel steel with addition of columbium or tantalum, or both (that is, the steel or alloy *per se*), *but the Examiner rejected these as anticipated by an earlier patent and the Board sustained the Examiner*. The Examiner said, however, in his decision of July 26, 1935, in speaking of the main reference:

> He disclosed a composition of matter, however, which necessarily has the same characteristics as the alloy of the proposed counts. *That he did not recognize that the alloy would resist intergranular corrosion is admitted. That the discovery of this property in the application of the alloy to new uses where this property was necessary involved invention, is also admitted and claims which bring this out are allowed* (italics supplied).

One of these allowed claims, referred to by the Examiner, reads as follows:

> 33. A fusion-welded article composed of an austenitic corrosion-resisting steel containing about 12% to 30% chromium, about 7% to 25% nickel, about 0.07% to 0.2% carbon and from 0.3% to 2.5% of an additional material acting to lessen materially

---

*Note: The corporate plaintiff here owns the Schafmeister application, and the attorney for Becket & Franks was in the courtroom at the time of the trial and permitted reference to what follows to be made in the argument in the Court below.

> loss of corrosion resistance on prolonged holding at 500° C., the balance substantially all iron, said additional material consisting substantially all of columbium and tantalum.

The Board, at the request of both parties that the issues be fully defined in the interference, authorized the Examiner to allow two even broader claims, and as to these broader claims, and those referred to by the Examiner, as allowed, the interference was redeclared and went to testimony and final hearing.

The claims thus authorized by the Board read as follows:

> 9. A metal article which in its normal use is subjected to active corrosive influences while the metal in at least part of the article is in a condition resulting from heating at ranges within the carbide precipitation range (approximately 500° to 800° C.) without subsequent heating at substantially higher temperatures, said article being resistant to said corrosive influences and composed of a corrosion-resisting austenitic steel, the iron of which is substantially all in the gamma form, containing about 12% to 30% chromium, about 7% to 25% nickel, about 0.07% to 0.2% carbon, and from 0.3% to 2.5% of an additional material consisting substantially all of columbium and tantalum, the balance substantially all iron.
>
> 10. Same as 9, except words "columbium and" are omitted.

This interference is interesting also as showing how opinions naturally change with a growing knowledge of the art. The same Examiner, who was sustained in the instant case in 1932, by the Board, in his holding that when the steel or alloy is old no articles made of such steel could be patentable, three years later, when the art was more fully developed, and he understood it better, admitted that, with an alloy similarly old a claim could validly be allowed for a "fusion welded" article made of such alloy. The Board went even further and allowed claims to "metal articles" qualified exactly as are the "metal articles" of the claims here in issue.

Conclusion.

The Board of Appeals did not deny that Dr. Strauss made a discovery of an unknown property of austenitic chromium-nickel steel containing less than .07% of carbon, namely that it would resist intergranular corrosion, after exposure to the "deleterious" or "carbide precipitation" range of temperature and without subsequent curing by heating to a high temperature followed by quenching. Whether or not the references show Dr. Strauss' alloy to be old, there was never any holding by the court below, or in the Patent Office, that the references disclosed this particular discovery. This discovery was utilized in making chemical vessels, etc., of the alloy, and was thus given practical and highly valuable application.

The authorities clearly show that under these circumstances a patentable invention was made. The Board of Appeals itself has only within the last year, in the case of two applications claiming a very similar solution of the same problem as involved here, allowed claims which are almost identical in language with those involved here—*in spite of the fact that both Examiner and Board of Appeals held the alloy itself not to be patentable.*

POINT III.

Claims 25, 26 and 27 Are Not Too Broad.

The Board held with respect to the above claims (R., 100) that:

> If article claims of this type could be otherwise allowed, it would not follow that all proportions of chromium and nickel would be operative and that

> applicant, in view of his limited disclosure, would not be entitled to claim all of such possible proportions.

Claim 25, directed broadly to certain metal articles, specifies that the metal is

> composed of an austenitic chromium-nickel steel alloy * * * containing iron, chromium, nickel, and carbon, the amount of carbon being not greater than 0.07%.

No specific figures are given with respect to the chromium and nickel contents. In Claim 25 the iron content is not defined by figures; in claim 26 the iron content is stated as "being in excess of each of the other ingredients", and in claim 27 it is stated as "being in excess of 50%".

The Board of Appeals took the position that these claims were so broad as to include *any* proportion of chromium and *any* proportion of nickel.

Of course, there can be no quarrel with the principle of law which the Board undoubtedly had in mind, that any steel (alloy) referred to in a claim must be defined with sufficient clearness to enable the public to know just what is being claimed.

However, the Board either overlooked the important fact, or did not understand the fact, that in all of these claims there are distinct limitations which, with much precision, fix the proportions of iron, chromium and nickel with substantial accuracy. The alloy is referred to as a "steel" alloy, and the steel alloy is defined as being austenitic, and as resisting corrosion.

Professor Waterhouse testified (R., 24) that a steel alloy

> must contain at least fifty per cent of iron in order to deserve that name, because this is a steel that we have in mind, and a steel is primarily an iron alloy, so that I should say it must have at least fifty per cent of iron.

Here is a substantial limitation inherent in the word "steel", that the iron content should be at least 50%.

As shown at pages 8 and 25 of this brief, a chromium nickel steel alloy, in order to be *austenitic,* must not lie within the "ferritic" field (Plaintiffs' Ex. 4, R., 105). This means that the composition of the steel alloy must lie to the left of the 50% iron line (XY) in Exhibit 4 (R., 105), and within field C, and such portions of fields D and E as lie to the left of such iron line. As steels falling within fields A and B are not austenitic at room temperature, the claimed steels cannot fall within these fields.

The true, and very restricted, field within which Dr. Strauss' steel, as described in the specification, is found, is shown on the subjoined "Fig. 5 Strauss Range", which is a copy of Exhibit 7 (R., 111). The heavy straight line of such figure represents the 50% iron line, to the leftward of which are the ranges including more than 50% of iron. The field lying above, or leftwardly beyond, the upper of the two curved heavy lines, is the ferritic field within which the steel alloys may not lie without completely ignoring the designation "austenitic".

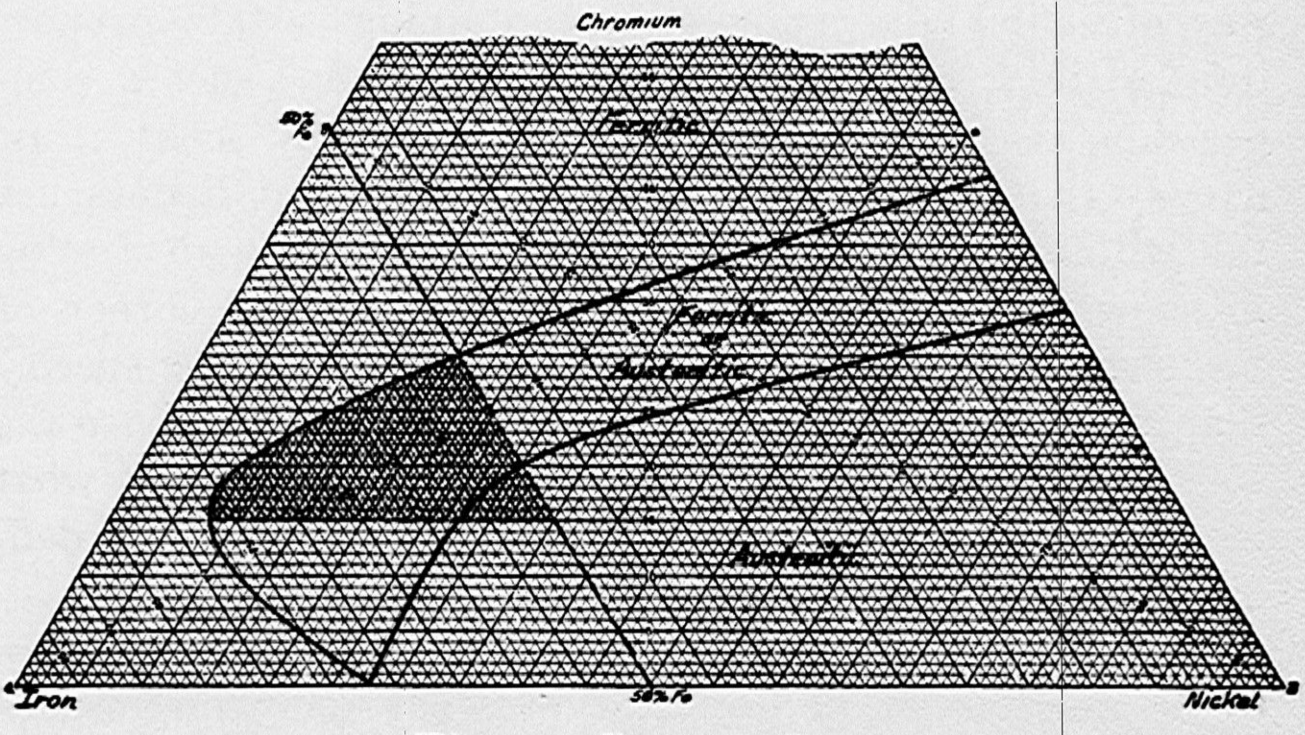

Fig. 5; Strauss Range.

Professor Waterhouse testified (R., 30) that the words "chemically neutral", in the first line of Dr. Strauss' specification (R., 65), mean that the steel in question "is resistant to chemical attack" and that this means that "approximately 15 per cent of chromium would be necessary to have that effect." This means that a steel according to Dr. Strauss' specification must contain at least 15% of chromium.

The hatched portion of "Fig. 5, Strauss Range", stops at its lower border at the 15% chromium range.

While the words "chemically neutral" do not appear as such in these claims, their complete sense appears in the language of each of the claims, "said articles being resistant to said corrosive influences". According to Professor Waterhouse, the articles would not be resistant to corrosive influences (including liability to *surface* corrosion), unless they contained at least 15% of chromium, which is merely another way of saying that they are "chemically neutral".

Thus the hatched portion lying below, and to the right of, the upper curved line, to the left of the 50% iron line, and above the 15% chromium line, defines the small field which is essentially covered by claims 25, 26, and 27.

It would seem to be the simplest, clearest and fairest way of claiming a composition containing certain proportions of iron, nickel, and chromium, to define such a composition, as here defined, by telling exactly *what it is,* namely that it is austenitic, thus showing that it does not fall within the large ferritic field, define it as a *steel* alloy to show that it falls within the lower lefthand corner of the ternary chart (50% or more of iron), and to specify that it *resists corrosion,* which makes it lie on or above the 15% chromium line. This tells the metallurgist just what is claimed. He cannot go wrong, and therefore this definition is fair to the public.

[As held by the Courts, patents relating to steels "are to be interpreted in the light of what their disclosures would mean to one accustomed to the art of making steel, or to a metallurgist * * *," *American Stainless Steel Co.*

v. *Ludlum,* 290 F. 103, 107 (C. C. A. II). The specification of a patent "is not addressed to lawyers, or even to the public generally, but to the manufacturers of steel, and any description which is sufficient to apprise them in the language of the art of the definite feature of the invention, and to serve as a warning to others of what the patent claims as a monopoly, is sufficiently definite to sustain the patent." *Carnegie* v. *Cambria,* 185 U. S. 403, 437].

On the other hand, this definition is fair to the inventor, because it does not compel him to rely upon specific figures in his claims to define his invention. It is conceivable that someone else may try to avoid a claim, expressed in *figures,* by using a little less than 50% iron, a little less than 15% chromium, and a little less than 6% or 7% nickel. He would be using the invention, perhaps less effectively, but nevertheless using the essence thereof. On the other hand, someone may find a method, or a condition of metal, which might render the resulting steel austenitic, even though in one or the other particular he went below or above any figures which might be inserted in the claim, thus again using the essence of the invention without violating the claim in terms. As the courts sometimes refuse to be bound by the exact figures inserted in a claim (see, for instance, *Panzl* v. *Battle,* 132 Fed. 607, 608, 613), but find infringement if the *essence* of the invention has been used by the alleged infringer, a lawsuit troublesome to the courts, and expensive to the litigants, becomes necessary in order to determine what these figures really mean.

[What apparently troubled the Board was its lack of familiarity with "austenitic chromium-nickel steels". This expression gives just as definite a picture (to the metallurgist) as do the expressions brass, bronze, paper, wood, or "cup of coffee with sugar and cream", all of which represent definite concepts, even though they may cover material of various proportions of ingredients, or of various kinds. Thus, in *Treibacher* v. *Roessler,* 219 Fed. 210, the Court of Appeals for the Second Circuit sustained a claim reading "A pyrophoric alloy, containing cerium alloyed with iron, substantially as and for the purpose described".]

How else may an irregular field such as that shown in "Fig. 5, Strauss Range", be properly defined in a claim? The Patent Office may reply that this could be done by means of specific figures giving iron, chromium, and nickel contents within certain ranges. How is this to be done? Should such ranges, for instance, be expressed by saying "from 7% to 35% nickel, from 15% to 30% chromium, and at least 50% iron?"

Such a range figure leads to all the difficulties of interpretation, and the confusion of thought, discussed at pages 28-29 of this brief. A lozenge range chart would run into the "ferritic" field and also within the intermediate "ferritic or austenitic" field where, as already shown, the material may or may not be austenitic, according to whether or not it has been quickly cooled (quenched).

To this the Patent Office might reply that this confusion cannot possibly occur, because the material is specified as *austenitic,* as a *steel* and as *corrosion resistant,* which expressions clearly define that portion of the range which is intended, and would prevent any misconstruction of the claim. This would, of course, mean that the claim is construed by its specification of austenitic, corrosion resistant, and steel, and not by the figures, and the figures could therefore serve no useful purpose, but could serve only to create confusion.

POINT IV.

Criticism of reference in the claims to "conditions of possible use" is not justified.

The Board of Appeals stated, with respect to all of the claims, that, while it did not contend that no true discovery had been made that if the carbon is maintained at an extremely low percentage the objectionable peculiar corrodibility will not be developed:

> We are unable to agree that the appealed claims directed to articles formed of this material and accompanied with certain reference to *conditions of possible use* can be allowed where the steel as such is shown to be anticipated (R., 100).

To a somewhat similar effect is a statement of the Board (R., 99-100) that

> patentability is not involved in forming articles of this steel and attempting to distinguish them by supposed conditions to which they will be subjected in manufacture or use.

It has already been shown, under Point I, that the steels of the references are not austenitic, and, under Point II, that, whether or not they are austenitic, claims to certain metal articles made of such steels are patentable because they specify a practical application of a discovery made by Dr. Strauss.

It remains to discuss the criticism of the Board of Appeals to the manner in which the articles have been defined.

In practice the articles referred to would, in almost all cases, be *welded* articles, and if Dr. Strauss had claimed welded articles, made of the steels specified, there could have been no valid criticism of the claims, as shown by the claim subsequently allowed *by the Examiner* in the *Becket & Franks* v. *Schafmeister* interference (see p. 45 above). While the witness Müller testified (R., 56-7) that the steel to the extent of thousands of tons has been used in making welded articles, it is conceivable that, for instance, as in the case of an autoclave, a chemical vessel (even though not welded) might be subjected to the carbide precipitation range of temperature and substantially at the same time to corrosive influences. The claims were therefore drawn more broadly than merely to welded articles.

If such articles are never to be subjected to a corrosive, the invention is completely useless. It is only an article to be used under conditions which would otherwise cause intergranular corrosion that could exhibit the advantages of Dr. Strauss' invention. Therefore, in all fairness, both to applicant and the public, this limitation to the particular use had to be inserted in the claims.

The advice (or warning) given by *Robinson on Patents,* Vol. 2, pages 119-120, should be heeded in drawing claims of this kind:

> On the other hand, where the invention is new and patentable only when considered with reference to certain purposes or objects, it must be claimed only in connection with such purposes or objects and a Claim for it without this limitation would be void. The importance of this rule becomes especially evident in cases where the real invention exists in the new use of some art or instrument already known. * * * The use itself must be set forth and claimed, this being the only new product of inventive skill; and in the Claim for this new use, the objects upon which the art or instrument is now to be employed, or the mode of operation in which it is now to be applied, must be particularly described.

This reference to use is not at all unusual in claims,* although the reference is not always made by employing the word "use". The use is, in most cases, implied in the name given to the article.

Thus, in *General Electric* v. *Hoskins,* 224 Fed. 464 (more fully discussed at p. 41 hereinabove), the product for which the patent was sustained was an electric resistance element, in other words, an ordinary coil of wire (or strip, strand, or filament) made of a known alloy. A coil of wire was old, the alloy was old; a coil of wire made

---

*NOTE: See for instance patent to Hildorf No. 2,021,783, November 19, 1935: "An article *for use* at high temperatures, such as a grate bar, stoker parts * * * the article * * * being formed from steel containing" certain proportions of carbon, chromium, manganese, silicon, tungsten, and iron.

of the alloy had no utility except for a single use, namely use within an electric circuit for the purpose of being heated by the electric current, thus forming a useful ingredient in a toaster, heater, or ironer. Here the use was so limited that the art had a name for it, namely "electric resistance element". If this name had not been available, the patentee might very well have claimed the coil as one for use in an electric circuit.

In *Ex parte Fulweiler & Jordan,* 24 U. S. Pat. Q. 268 (discussed hereinabove, p. 43) the article involved was a gas meter diaphragm, in other words, nothing but a circular piece of leather with a hole in its center. Such a diaphragm was old, and the material of which it was made was old, but the patent was allowed. Here again the application of the invention was in so narrow a field that the art had a name for this piece of leather, namely "gas meter diaphragm". If no such name had been available the applicant might just as well have said, "a circular piece of the particular leather having a hole in it for use in a gas meter for controlling the flow of gas".

In *Danbury* v. *American Hatters,* 54 Fed. (2d) 344, the Circuit Court of Appeals for the Second Circuit sustained a claim to a solution of one pound of sodium peroxide in three gallons of water (neither the sodium peroxide nor the water, nor a solution of the former in the latter, being new), "as a new composition of matter adapted for the carroting of fur" (see Claim 1, Pat. No. 1,507,891). The patentee might have said "carroting agent", but he chose the language sustained by the Court for which the more concise expression would have been a mere equivalent.

In *Ex parte Miller,* 26 U. S. Pat. Q. 336, the Board of Appeals allowed a claim for a "cutting tool" made of a known alloy. Here again the use was a very narrow one and the art had a name for it. Had there been no such convenient name available, then the expression "for use in a tool for cutting metal" would have been available, and would have expressed the same idea as was expressed by the fewer words actually used.

The right to a patent, otherwise clear, should not be denied because of the lack of a suitable concrete expression, thus necessitating the use of a series of words for expressing the patentee's thought. As was held by Commissioner Simonds in *Ex parte Painter,* 57 O. G. 999-1000 (1891 C. D. 200-1):

> On the other hand, when a man has made an invention his right to a patent for it, or his right to a claim properly defining it, is not *to be determined by the limitations of the English language.* (Italics supplied.)

The necessity for allowing considerable latitude as to language in a case like the instant one was recognized by the Board of Appeals in *Ex parte Loepsinger and Trafton,* 25 U. S. Pat. Q. 332. The claim related to

> a hygroscopic element for humidity responsive apparatus consisting of a piece of animal membrane composed substantially of elastin.

Elastin was old, and hygroscopic elements for humidity responsive apparatus were old. Here the Board had a claim for the use of an elastin element in connection with a certain apparatus.

> While it is considered true that merely discovering a new property of some known substance would not afford a basis for a claim for that substance as such, it is possible that *if a claim be drawn in such way as to be directed to an element taking advantage of the discovered properties, that considerable latitude can be allowed in the form of claim.*
>
> * * * * * *
>
> The present form of claim "still limits the claim to an element, that is, an article which *may be used* in such hygrometric apparatus." (Italics supplied.)

Dr. Strauss' invention happens to be applicable to a large number of objects for which the language has as yet no generic name—for instance, chemical vessels, pipes, tubes, valves, storage tanks, etc. If there were a single expression in the dictionary covering this wide range of objects, no criticism could have been made if such word had been used. No such word being available, the applicant had to do the next best thing, and state expressly, what is implied, for instance, in the expressions hereinabove referred to, namely the use to which the material is to be put.

Perhaps the best evidence that an expression directly referring to use is not objectionable to the Patent Office, is shown by the claims involved in the *Becket & Franks* v. *Schafmeister* interference and copied in part hereinabove (p. 46). As there stated, the Board of Appeals having held the alloy to be old, permitted the Examiner to add claims in which the metal article was defined as one

> which in its normal use is subjected to active corrosive influences while the metal in at least part of the article is in a condition resulting from heating at ranges within the carbide precipitation range, without subsequent heating to substantially higher temperature * * *.

The language just quoted shows also that the Board of Appeals, more than three years after it decided the instant case, allowed a claim which specified an article also by "a supposed condition to which it will be subjected in *manufacture*" (the second feature to which the Board objected). The language which the Board of Appeals had in mind in making this objection, and which is contained in all of the claims is "while the metal in at least a part of the article is in a condition resulting from welding or heating, * * * without subsequent heating to substantially higher temperatures."

This language was inserted in the claims merely for the purpose of stating more clearly to the public exactly what the applicant had in mind, and constitutes a limitation of the claims not at all made necessary by any patent cited by the Examiner. These words could just as well be omitted as the expression "free from * * * segregated carbide" (contained in all of the claims) is what really tells the story.

The gist of the invention is that a metal article (welded article) is made of austenitic chromium-nickel steel (alloy) containing less than .07% of carbon. This metal article would be useful for all purposes for which there could be used metal articles made of austenitic chromium-nickel steel containing the known proportion of carbon (.1% or more) but here the Strauss article would present no advantage whatsoever. The patentable utility of the Strauss article begins when his article is used under conditions which would ruin the metal articles of the higher carbon content, namely when there is necessary a subjection to a carbide precipitation range of temperature, and, either for purposes of economy or because of size, etc., the sick metal cannot be cured by reheating followed by rapid cooling (quenching).

Therefore, in effect the language objected to by the Board is merely an aid to the understanding of the claim, but not a necessary element thereof.

POINT V.

Claim 28 is not objectionable as without foundation in the specification.

Preliminary Observations.

Claim 28, specifying a range of about 15% to 30% chromium, and 5% to 15% nickel, stands midway between the generic claims 25, 26, and 27 intended to cover metal articles made of steels within the *entire* range of austenitic chromium-nickel steels, and the more specific claim, No. 29, covering the range 18%-25% chromium and 7%-12% nickel given *by way of example* in the specification (R., 65).

If the Court should decide that the broader claims 25, 26, and 27 or, in fact, any one of them, should be allowed, the invention would be broadly protected, and appellants would then be willing to withdraw claim 28.

If the Court should decide that the broader claims, 25, 26, and 27, or any one of them, covers patentable invention, but is not satisfied with the language specifying the metal articles, but is prepared to allow the claims or any one of them limited to "welded articles" (instead of being limited to articles "in a condition resulting from welding or heating at ranges of approximately 600° to 900° C.") then the invention would be covered sufficiently for appellants' purposes and claim 28 could be regarded as withdrawn.

If the Court should regard claims 25, 26, and 27 or any one of them as covering a patentable invention, but believes that the range should be specified by figures (for instance, "from about 7% to 35% of nickel, and from about 15% to 30% of chromium") the invention would be broadly protected, and appellants would be willing to have the Court regard claim 28 as withdrawn.

Appellants, realizing that this case involves a comparatively new art, and that the study of the art and of the invention, will entail a good deal of work for this Court, would therefore be very happy to relieve this Court of the necessity of considering a claim which covers a practical range of proportions (from the steelmakers' standpoint) but could well be withdrawn if broader claims were allowed; but they feel that under the peculiar circumstances of this case they may not do so at this time.

While it is believed that the broader claims, 25, 26, and 27 are proper, both as to scope and as to form, and should therefore be deemed patentable as they stand, it is, of course, always possible that this Court may hold that the claims should contain definite proportion figures, and appellants are not certain as to how this Court would construe, in this connection, the broad language of its own decision in *Lucke, et al.* v. *Coe, Commissioner of Patents,* 69 Fed (2) 379. In such opinion the Court referred (p. 381) to its earlier decision in *Durham* v. *Seymour,* 6 App. D. C. 78, as having decided

> that the complainant in an equity proceeding under Sec. 4915 is confined to the claims presented in the Patent Office and that the patent must issue, if at all, upon those claims only.

If this language be construed literally, it might mean that no change of language, and no limitation of the claims, would be permitted by this Court, even if it found patentable invention somewhere within the ambit of the claims passed upon by the Patent Office. If this should be the meaning of the decision in the *Lucke* case, then appellants would have to urge claim 28, which is broader than claim 29, and at least contains reference to broader proportions.

Appellants take this occasion to state that they do *not* understand that this Court intended to decide, in the *Lucke* case, that if the Court found any claim, considered by the Patent Office to be somewhat too broad, such claim could not be allowed if proper limiting language were inserted.

The statute distinctly states that, in a proceeding under Sec. 4915 the Court

> may adjudge that such applicant is entitled, according to law, to receive a patent for his invention, as specified in his claim, *or for any part thereof,* as the facts in the case may appear * * *.

In the *Lucke* case the Court, at the very beginning of its opinion, *italicized* or, in other words, emphasized the words *"as specified in his claim, or for any part thereof"* and further indicated its emphasis by saying "Italics ours".

It seems clear therefore that the Court was not unmindful of the language of the statute which permits a more limited claim to be allowed by the Court, if the claim, as presented is too broad, provided the claim as presented has been considered by the Patent Office and was not, as in the *Lucke* case, a claim (in fact, a long series of claims) covering combinations of elements, which had never been presented to the Patent Office, and therefore had not been properly searched by the Examiner.

In the *Durham* v. *Seymour case,* 6 App. D. C. 78, referred to in its decision in the *Lucke* case, this Court pointed out that *additional* claims should not be presented, because if the Patent Office had allowed the claims actually presented, applicant never would have received the additional claims. It may, however, be pointed out that, if the only objection to the claims is that they may be slightly too broad, then, if applicant had secured a patent with such claims, he could thereafter have cured (narrowed) them by disclaimer or reissue.

It seems clear that what was condemned was the presentation of *additional* claims, as appears from the following language of this Court in the *Lucke* case (p. 382, col. 1, top):

> We reaffirm our ruling in *Durham* v. *Seymour,* 6 App. D. C. 78, to the effect that while section 4915 authorizes the introduction of new evidence, *it does not authorize the filing of additional claims.* (Italics supplied.)

It is again requested that the Court do not assume, from the above discussion, that appellants believe claims 25, 26, and 27 to be too broad. The discussion is intended to explain why appellants at this time cannot avoid the necessity of discussing claim 28, by withdrawing such claim.

Claim 28 Discussed.

Claim 28 covers the metal articles, hereinbefore discussed, but specifies iron as the major ingredient, more than 15% and less than 30% of chromium, and more than 5% and less than 15% of nickel, carbon not greater than .07%.

This claim was criticized by the Board of Appeals (R., 100) because the proportion ranges of chromium and nickel are unwarranted, there being "no basis in the original disclosure for the specific numbers 15% and 30% of chromium, or 5% and 15% of nickel".

It has already been shown hereinbefore, under POINT III (see also Strauss Range chart, R., 111) that the steel of applicant's claim may contain from 15% to 30% of chromium and from *about* 7% to 35% of nickel. Professor Waterhouse testified that

> From the practical standpoint, that is from the steel makers' and steel fabricators' standpoint, roughly about one-half of that field would be involved; and, in regard to percentages, from 15 per cent to 30 per cent of chromium. The upper line, marked by the thick black line and the limit to the right extending from about 7 per cent. of nickel to 20 per cent (indicating).

The most important limits from a practical standpoint are usually defined by the inventor in his most specific claim, here claim 29, which specifies 18% to 25% of chromium, and 7% to 12% of nickel; but such a claim might perhaps be avoided by using more than 12% of nickel and somewhat less than 18%, or somewhat more than 25% of chromium, but still be within the range important from the steelmaker's standpoint. Applicant therefore presented a claim somewhat broader than claim 29, but not so broad as claims 25, 26, and 27.

In view of the proof of the Strauss Range chart, applicant was completely justified in specifying from 15% to 30% of chromium and from about 7% to 15% of nickel (5% less than specified by Professor Waterhouse). He might have put his upper range of nickel as high as 20% but this he was not compelled to do. It was held in *United Chromium* v. *International Silver Co.*, 60 Fed. (2) 913, 915, that applicant may not be criticized for, or prevented from, claiming less than he might be entitled to claim.

In view of the testimony of Professor Waterhouse, it would appear that the lowermost limit for nickel, 5%, may perhaps be slightly too low, and should be "about 7%" (R., 34). However, this is not fatal to the claim as a whole, because the claim could be sustained by this court if corrected as indicated.

R. S. Sec. 4915, which authorized the present suit, provides specifically that the court may judge that the applicant is entitled to receive a patent

> as specified in his claim or for any part thereof, as the facts in the case may appear.

A broader claim may therefore be limited by this court if this court finds that the facts warrant so doing, especially in order to correct what may have been a slight error.

Conclusion.

Dr. Strauss made the discovery that austenitic chromium-nickel steels could be subjected to the deleterious or carbide precipitation range of temperature without having the carbon rob the grains of their protective chromium, provided the carbon content was less than .07%, as distinguished from such steels containing .1% of carbon or more in which, under these conditions, chromium carbide was formed and had to be removed by a curative process (reheating and quenching) if the metal was to resist intergranular corrosion. He made this discovery available to the arts by using the metal in the manufacture of articles which were to be used under conditions which would expose them to liquid corrosives.

(a) The discovery (invention) of Dr. Strauss is patentable.

(b) Claims 25, 26 and 27 definitely specify the limits of proportions, as shown in the Strauss range chart (Exhibit 7) because the words "austenitic", "steel" and "resistant to said corrosive influences", clearly define the field shown in such range chart.

(c) Whether or not the steels with respect to which Dr. Strauss made his discovery are shown to be old, the discovery was new and the practical application thereof was new and patentable.

(d) The claims in issue define the invention and are not objectionable either as to substance or to form.

Any doubts should be resolved in favor of the appellants.

The decision of the lower court should be reversed and the Commissioner of Patents ordered to issue a patent on Dr. Strauss' invention containing the five claims here in issue.

Respectfully submitted,

Roberts B. Larson,
Attorney for Appellants.

Fritz v. Briesen,
Of Counsel.

December 9, 1936.

UNITED STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA
FILED JAN 16 1937
Moncure Burke
CLERK

No. 6832

In the United States Court of Appeals for the District of Columbia

April Term, 1936

Krupp Nirosta Company, Inc., and Benno
Strauss, appellants
v.
Conway P. Coe, Commissioner of Patents,
appellee

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

R. F. WHITEHEAD,
Solicitor, United States Patent Office.

INDEX

Page

Statement of the case ---- 1

Appellants' questions on appeal ---- 3

Summary of argument for appellee, the Commissioner of Patents ---- 4

I. Steels as of the type described and claimed in the application on appeal were of public knowledge in the United States prior to any date to which the application in suit is entitled ---- 4

II. Applicant discloses no new method of manufacture of the alloy or articles made therefrom but has simply applied a new terminology thereto ---- 9

III. Claims 25, 26, and 27 are broader than the disclosure of the application as filed ---- 12

IV. Applicants may not claim articles defined only by conditions of possible use ---- 13

V. Claim 28 is unwarranted by applicant's disclosure ---- 13

VI. The claims must be considered as passed upon by the Board of Appeals of the Patent Office and appellant may not present new or amended claims ---- 14

Conclusion ---- 16

Table of cases:

Bakelite Corporation v. *Coe*, 83 F. (2d) 553—App. D. C. ----

Corona Cord Tire Co. v. *Dovan Chemical Corp.* 276 U. S. 358–385 ---- 13

Lucke v. *Coe*, 63 App. D. C. 61, 69 F. (2d) 379 ---- 14

Steward v. *American Lava Co.*, 215 U. S. 161–168 ---- 10

Thacher v. *Board of Supervisors*, 235 Fed. 724–725 ---- 10

Thompson Spot Welder Company v. *Ford Motor Company*, 265 U. S. 445–447 ---- 9

In the United States Court of Appeals for the District of Columbia

APRIL TERM, 1936

No. 6832

KRUPP NIROSTA COMPANY, INC., AND BENNO STRAUSS, APPELLANTS

v.

CONWAY P. COE, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

STATEMENT OF THE CASE

This is an appeal from the decree of the Supreme Court of the District of Columbia (now The District Court of the United States for the District of Columbia) (R. p. 15) dismissing a Bill in Equity brought under the provision of Section 4915 R. S. (U. S. C., Title 35, Sec. 63) by the Krupp Nirosta Company, Inc., and its assignor Benno Strauss.

It was sought by the Bill to have the Commissioner of Patents authorized to issue to the former on the application of the latter a patent containing claims to a metal article formed of an austenitic chromium-nickel steel alloy. These claims, numbered 25, 26, 27, 28, and 29, will be found on pages 3 and 4 of the record.

The primary examiner held that Austenitic Chromium-Nickel Steel Alloys were old and articles of the type described in the claims on appeal were known in the United States prior to any date which could be claimed for this application (R. pp. 89–90). The Board of Appeals agreed with the primary examiner that the steel was old, and held that patentability was not involved in forming articles of this steel and attempting to distinguish them by supposed conditions to which they might be subjected in manufacture or use (R. pp. 97–100). The court below concurred in the findings and conclusions of the Patent Office tribunals.

During the trial before Mr. Chief Justice Wheat, plaintiff's expert testified to the effect that "In 1922, articles made of austenitic chromium-nickel steels were entirely austenitic, a substantially non-resisting or a non-corrosive type of article. That is, they were substantially a noble metal" not subject to attack by corrosive influences (R. pp. 46–47).

The lower court found as a fact from all the evidence submitted that:

> Welded articles of commerce made of austenitic chromium-nickel steel alloys having the compositions of chromium 18 to 25%, nickel 7 to 12%, and iron over 50%, were known and used in the United States long prior to the earliest date which plaintiff in this suit claims as his convention date. The carbon content of these alloys was entirely in solution, so that the articles were not subject to inter-granular corrosion when sub-

> jected to corrosive influences. These articles had the same physical properties as the articles referred to in the Strauss application in suit.

And he concluded as a matter of law that:

> The steels disclosed by plaintiff Strauss in his application, being disclosed in the references cited, plaintiffs are not entitled to a patent on articles made of such steels.

APPELLANTS' QUESTIONS ON APPEAL

The appellants in their brief (p. 2) state the questions which they desire to argue before this court as follows:

The first question is whether or not the references cited disclose the steels, and, if they do not, whether or not the invention is patentable.

The second question is (irrespective of the novelty of such steel per se) whether the discovery by Dr. Benno Strauss of certain unsuspected qualities of the steels which make them peculiarly suitable for resisting a certain type of corrosion, renders such metal articles patentable.

The third question is whether claims 25, 26 and 27, are broader than the disclosure.

The fourth question, not raised by the court below, but apparently raised by the Board of Appeals, relates primarily to the form of the claim, namely, whether or not the articles may properly be defined by reference "to conditions of possible use."

The fifth question is whether claim 28 is warranted by appellant's disclosure.

SUMMARY OF ARGUMENT FOR APPELLEE, THE COMMISSIONER OF PATENTS

Appellee's contentions, in the order in which they will be presented herein, are:

I. Steels as of the type described and claimed in the application on appeal were of public knowledge in the United States prior to any date to which the application in suit is entitled.

II. Applicant discloses no new method of manufacture of the alloy or articles made therefrom but has simply applied a new terminology thereto.

III. Claims 25, 26, and 27 are broader than the disclosure of the application as filed.

IV. Applicants may not claim articles defined only by conditions of possible use.

V. Claim 28 is unwarranted by applicant's disclosure.

VI. The claims must be considered as passed upon by the Board of Appeals of the Patent Office and appellant may not present new or amended claims.

I

Steels as of the type described and claimed in the application on appeal were of public knowledge in the United States prior to any date to which the application in suit is entitled

As stated by plaintiffs' expert, "In 1922, articles made of austenitic chromium-nickel steels were entirely austenitic, a substantially non-resisting or a non-corrosive type of article. That is, they were substantially a noble metal" like gold and platinum.

Looking at the prior art patents and publications (R. pp. 121–144) and then at the disclosure of the Strauss application, we find that the application discloses the same alloys having the same ingredient metals in substantially the same percentages, as is clearly shown by the following table:

	Chromium	Nickel	Carbon	Other elements
Smith	15–40%	1–15%	As low as 0.07%	Mn. Ti. Si. Al.
Everett	7–20%	4–20%	0.05 to 0.5%	Cu.
Terni	7–25%	0.05–20%	0.05–1.5%	Si. Mn.
The specification and claims of the Strauss App. as originally filed.	18–25%	7–12%	0.07% or less	Mo. Cu. etc.
Strauss amended App., both Specification and claims.	15–30%	5–15%	Not greater than 0.07%.	

The claims on appeal call for the following amounts of the various elements of the alloy:

Claims	% chromium	% nickel	% carbon	% iron	Other elements
25	Not stated	Not stated	Not greater than 0.07%.	Not stated	Not stated.
26	Not stated	Not stated	Not greater than 0.07%.	Not stated	Not stated.
27	Not stated	Not stated	Not greater than 0.07%.	In excess of 50%.	Not stated.
28	More than 15% and less than 30%.	More than 5% and less than 15%.	Not greater than 0.07%.	Not stated	Not stated.
29	18–25%	7–12%	Not greater than 0.07%.	A major ingredient.	Not stated.

(Attention is directed to the fact that the claims quoted on pages 5 and 6 of the record are not the claims which the applicant prosecuted before the Patent Office but will be discussed in this brief hereinafter under a heading VI. The claims presented to and passed upon by the Patent Office are contained in the record, pages 3 and 4.)

No claims were presented in the Bill for the alloy *per se.* Such claims were presented in the original application (R. p. 6) but were cancelled after rejection by the primary examiner and claims for the article made of the alloy presented in lieu thereof. This is an admission that the alloy was not new with the appellant Strauss and, as above pointed out, that such was the case is shown by the prior art cited by defendant.

The appellant, in an attempt to avoid the verbatim anticipation of the claims by the Smith patent, states in his brief (page 3) "The claims [in suit] contain a slight, but substantially immaterial, clerical error in that they specify that the carbon content should be 'not greater than .07%.' "

It is interesting to note that appellant did claim, and has since the filing of his application in the United States Patent Office claimed, .07% carbon as his invention (see original claim 5, R. p. 66, which was in the application when the oath thereof was executed the 17th of December 1928, R. p. 67.)

In the Strauss application no specific alloy is mentioned, only ranges of compositions of the elements chromium, nickel, iron, and carbon are set forth (R. p. 48), although as stated by plaintiffs' witness, Waterhouse, the chromium content of the alloy can be controlled within a "few tenths of one percent," the nickel content of the alloy can be controlled "within one-tenth of one percent or a little over that" and the carbon content of the alloy can be controlled "within one-hundredth or one-half of one-hundredth of one percent" (R. p. 48).

The similarity of disclosure of the ranges of composition of chromium, nickel, iron, and carbon disclosed in the Strauss application with the ranges of chromium, nickel, iron, and carbon in the prior art is clearly reproduced in the table, ante page 4.

Before the Board of Appeals of the Patent Office the appellant produced a chart (R. p. 94), and during the trial produced another chart, plaintiffs' exhibit 11 (R. p. 119). A reference to the chart on page 94 shows that the structure claimed by Strauss as illustrated in the rough-lined, small rectangle is completely covered by the disclosure of Terni, illustrated by the rectangle designated "blue", and is completely covered by the disclosure of Smith, illustrated by the rectangle designated "red", and partially overlaps the composition of Everett, as illustrated by the rectangle designated "yellow."

Plaintiffs' expert on cross-examination (R. p. 52) was asked to apply the ranges of composition expressed in the Strauss application to the chart, plaintiffs' exhibit 11 (R. p. 119) in the same manner as he had applied the references, Smith, Terni, and Everett. In doing so plaintiffs' expert showed (R. p. 52) that the larger quadrilateral area of Strauss bounded by dotted lines lay within and coincided on two sides with that of Smith and overlapped a large portion of Terni in green, and the smaller quadrilateral in full pencil lines (R. p. 52) lay within and coincided on one side with the quadrilateral area representing the ranges of Terni.

It is no wonder that plaintiffs' expert stated (R. p. 47) on cross-examination:

> Prior to the filing of the Strauss application, austenitic chromium-nickel steels were common in which iron was greater than 50 percent, chromium ranging from 15 percent to 30 percent, and nickel ranging from 5 percent to 15 percent, and these alloys were made up into articles of commerce.

When Mr. Chief Justice Wheat asked plaintiffs' expert to point out what he thought applicant expressed as the novel thought of his application, he could only reply: "The fact that if you keep the carbon below .07 percent and use the steel in practical work you get away from the corrosion trouble", which merely pointed out that when Smith, Everett, or Terni used .07 percent carbon or less as stated in their patents they obtained the same results as applicant would, since applicant employs no new process in the production of his alloys or articles (R. p. 48).

The Commissioner of Patents submits therefore that the lower court was correct when it, concurrently with the primary examiner and the Board of Appeals of the Patent Office, found that:

> Welded articles of commerce made of austenitic, chromium, nickel, steel alloys having the compositions of chromium 18–25%, nickel 7–12% and iron over 50% were known and used in the United States long prior to the earliest date which plaintiff in this suit claims as his convention date. The carbon content of these alloys was entirely in solution, so that the articles were not subject to inter-granular corrosion when subjected to corrosive influences. These articles had the same physical properties as the articles referred to in the Strauss application in suit.

The concurrent findings of three tribunals on this question of fact should be accepted by this court. *Thompson Spot Welder Company* v. *Ford Motor Company,* 265 U. S. 445–447, and cases there cited.

II

Applicant discloses no new method of manufacture of the alloy or articles made therefrom but has simply applied a new terminology thereto

Since the Strauss application discloses no new method of production of these steel alloys but their properties are inherent (R. p. 48) from the percentages of the constituent elements, the mere application of novel terms such as "inter-granular corrosion" and "inter-crystaline corrosion" (R. p. 39) to articles made of alloys old in the art does not lend patentability (*Thacher* v. *Board of Supervisors,* 235 Fed. 724–725, *Steward* v. *American Lava Co.,* 215 U. S. 161–168).

This is particularly true when the group of "articles" referred to by appellant is so indefinite as to include therein beer kegs, chemical equipment of all sorts (R. p. 49), large tanks and float balls for water toilets (R. pp. 32–47 and exhibit 6). Articles having the same composition as that of the application and resistant to active corrosive influences are disclosed in the prior art references. The Everett patent (R. p. 125) refers to articles formed from corrosive resistant chromium-nickel steel alloys. The Terni patent discloses corrosion resistant chromium-nickel steel alloys used in the parts of machines and hydraulic motors where they are exposed to corrosion under high pressure of water containing mineral salts and corrosive gases. The particular articles referred to are bands, plating, lids, fixed or rotating rings, distributing vanes, blast pipes, bolts, regulating devices, valves, tubes, and exhaust conduits (R. p. 127). The Smith patent discloses corrosion resistant chromium-nickel steel alloys used in articles or parts of structures wherein the article or structure is subjected to repeated heatings to high temperature or where the article or structure is subjected to the action of corrosive liquids, solids, or fumes, or to oxidized gases, and particularly mentions heat treating boxes, saggars, furnace parts, crucibles, glass molds, metal molds for foundry use, retorts, dies, die rings, and in fact any structure in the use of which the important property of the alloy may be utilized (R. p. 121). That these articles are the same as those claimed by applicant and are anticipatory of the claims is illustrated in the two following examples:

> Page 431 of Iron and Steel (a pocket encyclopedia) by H. P. Tiemann 1926, Second Edition, defines "heat treating boxes" as annealing boxes subjected to temperatures of 760° C. to 870° C. and then allowed to cool (R. p. 90).
>
> Webster's dictionary defines "saggars" as "a box for packing cast-iron articles in contact with hematite ore, to render the iron malleable while being decarbonized in the annealing-furnace." The temperature used in an annealing-furnace to malleablize iron is about 700° C. which is within applicant's range of approximately 600° to 900° (see also the quotation from page 255 of "The Making, Shaping, and Treating of Steel" published by Carnegie Steel Co. 1926, R. p. 90).

The finding of the lower court concurring with the findings of the two tribunals of the Patent Office that:

> The claims upon which this suit are based are anticipated by the disclosure of the prior

> art, particularly the disclosure of United States Patent No. 1538360, to Smith, British Patent No. 267024, to Everitt, and French Patent No. 625055 to Terni

should be accepted. *Thompson Company* v. *Ford Motor Company, supra.*

III

Claims 25, 26, and 27 are broader than the disclosure of the application as filed

A reference to the table, ante page 5, discloses that claims 25, 26, and 27 do not specify the percentages, even in ranges of the elements iron, nickel, carbon, and chromium, whereas the specification as originally filed was definitely limited to the percentage of chromium 18–25%, nickel 7–12%. These claims therefore are so indefinite that they include compositions inoperative for the purpose expressed in the application. (See the testimony of plaintiffs' expert R. p. 50, where he stated "When you have only 5% of nickel in the composition, in my opinion, it is not an austenitic steel.")

Appellee submits therefore that the conclusion of law of the lower court to the effect that "claims 25, 26, and 27 are not patentable to plaintiff since they specify no limits to the amount of chromium, nickel, and iron in the alloy and are therefore broader than the alleged discovery of Strauss", should be affirmed in view of the ruling of the Supreme Court of the United States in the case of

Corona Cord Tire Co. v. *Dovan Chemical Corp.,* 276 U. S. 358–385.

IV

Applicants may not claim articles defined only by conditions of possible use

Since, as stated by appellant, this proposition was not considered by the court below, appellee feels that this question is not properly before this court. However, since appellant directs pages 52 to 58 of his brief to this point appellee would like to point out that the definition of an article by the uses to which it may be put entirely disregards the provisions of R. S. 4886 in that it does not expressly point out and distinctly claim the invention. For example, if a person used the metal annealing box of the Smith patent at temperatures from 600° to 900° C. he would infringe the claims, but if he used it at temperatures from 1,000° to 1,200° C. he would not infringe them.

V

Claim 28 is unwarranted by applicant's disclosure

As shown by the table, ante page 4, the Strauss application as filed discloses the chromium content of the alloy as between 18% and 25%, and the nickel content as between 7% and 12%. Claim 28 (R., p. 4) claims the chromium content to be more than 15% and less than 30% and the nickel content more than 5% and less than 15%. Appellant's expert on cross-examination stated "In referring to Strauss' application, as originally filed, I do not find any reference therein to chromium content of 15 percent to 30 percent" (R., p. 47).

Appellee therefore submits that the conclusion of law of the lower court to the effect that

> Claim 28 is not patentable to plaintiff since it specifies ranges of the percentage of chromium and of nickel which were not disclosed in the Strauss application as originally filed.

is correct.

VI

The claims must be considered as passed upon by the board of appeals of the Patent Office and appellant may not present new or amended claims

Beginning on page 58 of the brief of appellees, it is argued that if the Court should find the claims as presented not allowable, it should permit the amendment of some or all of them in certain particulars, such as limiting them to "welded articles" or inserting "definite proportion figures"; and it is contended that a consideration of the claims in this manner is not forbidden by the decision of this Court in *Lucke* v. *Coe,* 63 App. D. C., 61, 69 F. (2d) 379.

It is submitted that the presentation of new claims or of amended claims is very clearly forbidden by that decision. It will be recalled that in the first decision in that case, the Court ruled that certain claims which had not been considered by the Patent Office should have been considered by the trial court, but, on rehearing, expressly ruled that the plaintiff in an equity proceeding under Section 4915 "is confined to the claims presented in the Patent Office and the patent must issue, if at all, upon those claims."

There is no difference between a new claim and an amended claim. A claim which has been amended so as to make it more limited, whether by narrowing some of the clauses of the claim or by inserting limiting provisions therein, is just as much a "new" claim as if it had been entirely re-written and presented as a substitute for the original claim.

If plaintiffs are to be permitted to change the claims during the proceedings under Section 4915 R. S., then the work which should have been done in the Patent Office will be transferred to the Court with no opportunity for further search of the prior art.

The argument presented here for limiting the holding in the Lucke decision is the same that was presented in that case but was not accepted by this court.

In the decision in *Bakelite Corporation* v. *Coe,* 83 F. (2d) 553, — App. D. C. —, this Court held that a claim which it was argued should have been considered by the Court below was properly refused consideration since it had not been considered by the Board of Appeals of the Patent Office.

There have been repeated attempts in the court below to obtain consideration of claims in a modified form but such consideration has been uniformly, and it is submitted properly, refused.

CONCLUSION

It is submitted, therefore, that the Findings of Fact and Conclusions of Law made by the Court below should be accepted by this Court and that the decree dismissing the Bill should be affirmed with costs against the appellant.

R. F. WHITEHEAD,
Solicitor for the U. S. Patent Office.

PAUL P. STOUTENBURGH,
Of Counsel.

U. S. GOVERNMENT PRINTING OFFICE: 1937

UNITED STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA
FILED DEC 29 1937

IN THE

United States Court of Appeals

For the District of Columbia.

No. 6832.

KRUPP NIROSTA COMPANY, INC. and
BENNO STRAUSS,
Appellants,

vs.

CONWAY P. COE, Commissioner of Patents,
Appellee.

BRIEF AMICUS CURIAE IN SUPPORT OF PETITION FOR REHEARING.

S. MORTIMER WARD, JR.,
On Behalf of Crucible Steel
Company of America.

RAYMOND J. MCELHANNON,
Of Counsel.

IN THE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA.

No. 6832.

KRUPP NIROSTA COMPANY, INC. and BENNO STRAUSS,
Appellants,

VS.

CONWAY P. COE, Commissioner of Patents,
Appellee.

BRIEF AMICUS CURIAE IN SUPPORT OF PETITION FOR REHEARING.

Introduction

We appreciate the opportunity given us by this honorable Court to file a brief as *amicus curiae* in this cause in support of appellants' petition for rehearing on their appeal. The decision of this Court on the question presented by this appeal, in our opinion will be one of far reaching importance particularly in the field of metal alloys which constitute a highly valuable and rapidly developing art in the metallurgical industries of this country.

The appellants here seek patent protection for their solution of the problem of preventing intergranular corrosion in the so-called "austenitic" chromium-nickel alloy steels. In the Strauss application as originally filed, his solution of this problem is stated to consist in keeping the carbon content of said steels below .07%.

A patent has thus far been refused either as to the alloy *per se* or to articles made therefrom which are subjected to conditions inducing intergranular attack, and for reasons stated in this Court's decision of November 29, 1937, in the above appeal. These are that "there is nothing new in the Strauss alloy"; that each of United States Letters Patent 1,538,360 to Smith, British patent 267,024 to Everitt, and French patent 625,055 to Terni, discloses "austenitic chromium-nickel steel" alloys; that the Smith patent discloses such an alloy which is "of substantially the same composition" as that of the Strauss application; that the Everitt and Terni patents "show that *austenitic* chromium-nickel steel alloys with *low carbon content are old*"; that as held by the Patent Office Board of Appeals, the steels disclosed in the three references above mentioned anticipate the Strauss "proportions"; and that "since the steel is anticipated as to composition by the references * * *, patentability is not involved in forming articles of this steel and attempting to distinguish them by supposed conditions to which they will be subjected in manufacture or use".

In view of these findings we feel called upon to present to this Court for its consideration, the facts on which we base our contention that the above mentioned patents teach only *ferritic* in contrast to *austenitic* chromium-nickel alloy steels; that there is no disclosure in these patents of a steel in accordance with the Strauss application which is resistant to intergranular corrosion, namely, an austenitic chromium-nickel steel containing under .07% of carbon, or of articles made of such a steel which are subjected to conditions inducing intergranular attack. But before so doing, we consider it to be of vital importance to the adjudication of the issues here, that the Court have clearly in mind the fundamental distinctions between the *ferritic* and the *austenitic* chromium-nickel steels.

Characteristic Differences of Austenitic vs. Ferritic Steels.

As to physical properties as well as other characteristics, these two types of steel are as different in many respects as though they were made of entirely different kinds of metal, such as steel on the one hand and brass on the other. For example, the ferritic steels may be hardened by quenching from above critical temperature and thereafter tempered by reheating, the same as plain carbon steels, and they are stiff and difficult to work; whereas the austenitic steels do not react to such heat treatments, and are relatively soft and ductile, and can therefore be bent and formed and shaped much more readily than the ferritic steels. The ferritic steels are magnetic whereas the austenitic steels are not. The ferritic steels are not susceptible to intergranular corrosion, whereas the austenitic steels are susceptible to such unless precautions—such as those of the Strauss invention—are taken to overcome this defect. Although both the ferritic and austenitic steels are resistant to *surface* in contrast to *intergranular* corrosion, the austenitic steels are often preferred in the industries to the ferritic types, for the reasons above stated that they may be worked, shaped, welded and otherwise fabricated more easily than ferritic steels.

The differences in properties and characteristics of the ferritic in contrast to the austenitic chromium-nickel steels are due to a difference in the state in which the iron is present in the steel. In the ferritic steels the iron is present in the so-called "alpha" form; whereas in the austenitic steels it is present in a different allotropic form referred to as "gamma" iron, the two forms constituting different modes of crystallization of the iron. It is due to this difference in mode of crystallization that the *critically* different properties above mentioned are imparted to the two types of steel.

Generally speaking, whether the steel will be ferritic or austenitic, depends upon the proportion in which the nickel is present in the steel in relation of the chromium content. That is to say, for steels of usual analyses, the steel will be ferritic if the nickel content is relatively *low* as compared to the chromium, and will be austenitic if the nickel content is relatively *high* in relation to the chromium. There is a certain range, however, of the nickel content in relation to the chromium, within which the steel is capable of assuming either a ferritic or an austenitic structure, depending upon the previous temperature treatment to which it has been subjected. Steels within this range of analyses will be austenitic if rapidly cooled or "quenched" from above the so-called "critical" temperature of about 1000° C. or more; whereas they will be ferritic if slowly colled from such temperature.

In the record of this case, appellants' witness, Waterhouse, has evolved (R., 28-29) a simplified diagram (R., 111) showing the division of all possible chromium-nickel-iron alloys into the three classes above referred to, namely, those which will be ferritic, those which will be austenitic, and those which may be ferritic or austenitic depending upon whether they have been cooled down slowly or rapidly from above the critical temperature.

For convenience in considering the points presented in this brief, this chart has been reproduced as Figure 1 of Exhibit A hereto annexed. Referring to this chart, the alloys falling in the range above and to the left of upper curve are the ferritic steels referred to; those below and to the right of the lower curve are the austenitic steels referred to; while those situated in the region between the upper and lower curves represent the range of alloys which may be either ferritic or austenitic depending upon whether they are cooled down from above the critical temperature slowly or rapidly, as aforesaid.

From this chart, Fig. 1, Exhibit A, it will be seen that if a steel contains, for example, 10% chromium and 5%

nickel, as shown by the plot X_1 thereof on the chart, it will be ferritic; and similarly will be austenitic if it contains, say, 10% chromium and 35% nickel, as shown by the plot X_2 thereof on the chart. On the other hand, if the steel contains, say 20% chromium and 15% nickel, as shown by the plot X_3 thereof on the chart, it may be either ferritic or austenitic depending upon the temperature treatment to which it has been previously subjected. That is, if the steel has been previously quenched or rapidly cooled from above its critical temperature, it will be austenitic, whereas if it has been slowly cooled from this temperature it will be ferritic.

Consideration of the Prior Art Patents.

With the above points in mind, let us consider the character of steels disclosed in the patents to Smith, Terni and Everitt above referred to. The percentage limits for nickel and chromium given in the Smith patent for the steels therein described are 15 to 40% chromium and 1 to 5% nickel; and as a specific example of the type of steel which the patent teaches, there is given an analysis containing 18% chromium and 4% nickel. In the Fig. 2 chart of the annexed Exhibit A, the shaded parallelogram shows the range of alloys embraced by the percentage limits above referred to of the Smith patent; while the specific example mentioned therein is shown at the point X on the chart. Figs. 3 and 4 depicit graphically in similar fashion the ranges of alloys and specific examples given in the Terni and Everitt patents. These charts correspond to those which are in the record at page 119.

It will be seen by reference to Figs. 2, 3 and 4 of Exhibit A, that in every specific example of a steel given in the Smith, Terni and Everitt patents, such steels fall clearly and wholly within the range of chromium-nickel steels which are always ferritic, and this irrespective of previous temperature treatment. Since these examples are given in these patents for the precise purpose of illustrating the types of steel which the patents are intended to teach, and since all of these steels are ferritic and none of them are austenitic, we submit that *these references should be construed as limited in disclosure, to what they actually teach one skilled in the art, namely, to steels of the ferritic type.*

But even if these patents are to be construed as disclosing all of the chromium-nickel steels co-extensive with the limits for chromium and nickel specified theren, as shown by the shaded parallelograms in Figs. 2, 3 and 4 of Exhibit A, it still cannot be said that there is any disclosure whatsoever in these references of an *austenitic* steel. This is so because these ranges at most extend only from the stably ferritic region into the field of alloys which may or may not be austenitic depending upon their prior temperature treatment. *But there is no disclosure in any of these references of subjecting the steels therein described to the prior temperature treatment necessary to render them austenitic, namely, heating of the steel to a point above the critical temperature followed by a rapid cooling or "quenching" therefrom.* **But this temperature treatment is just as essential to convert such steels into the austenitic state as is their metallurgical compositions; and the references are silent on this temperature treatment.**

It is further to be noted that these patents draw no distinctions whatsoever between the analyses within the limits disclosed, which fall entirely within the range of alloys which are always ferritic, and those which may or may not be ferritic depending upon the prior heat treatment referred to. No advantages resident in the one type of analysis as compared to the other, are pointed out; and no appreciation is evidenced as to the critically different properties of the one type of steel as compared to the other. On the contrary, the steels of both types are grouped indiscriminately in the patent as representing the same type of steel throughout, as indeed they are according to the teachings of these patents which are silent as to the temperature treatment required to convert certain of the analyses to the austenitic state, while the remaining analyses being stably ferritic are incapable of such conversion. Under these circumstances we do not apprehend how these patents may be deemed to disclose *austenitic* chromium-nickel steels.

As we view the matter, since these patents fail to disclose *austenitic* steels, they necessarily fail as well to disclose such steels having a carbon content within the Strauss range of less than 0.07%.

When consideration is given to the various points above noted, namely: that in none of these patents is there any mention of the problem of intergranular corrosion or its prevention; in none is any steel specifically disclosed which is inherently austenitic or resistant to intergranular attack; that all of the examples given in the above patents are those of ferritic steels and none of an austenitic steel; that the ranges of alloys disclosed in these patents embrace no analysis of a steel which inherently will be austenitic; that as to the analyses which fall within the range of steels that may or may not be austenitic depending upon previous temperature treatment, there is no disclosure of subjecting such steels to the temperature treatment requisite to render them austenitic; that in none of the patents is there any specific teaching of employing a carbon content of less than .07% in a steel analysis which may be rendered austenitic by proper treatment; that the patents throw all of the analyses disclosed therein into the single category of their specific examples, namely, the ferritic steels, and point to no criticalness as to the carbon content thereof; we respectfully submit that the cumulative evidence of all these factors forces one inescapably to the conclusion that these patents are wholly lacking in anticipation of the Strauss alloy.

Having clearly shown, as we respectfully submit is the case, that none of the references discloses the Strauss austenitic steel of less than .07% carbon, it would seem unnecessary to discuss the second point raised in our motion for leave to file this memorandum, *i. e.,* as to the patentability of the articles covered by the claims here appealed, assuming the steel *per se* to be old. Furthermore, we have carefully considered appellants' brief on this part of its argument in support of its petition for rehearing and we believe that it so clearly presents at pages 9 to 19 inclusive thereof, the argument in support of patentability of the articles, that anything that we might say on the subject would be substantially repetitious, and we therefore refrain from burdening the Court with further discussion on this point.

New York, N. Y., December 29, 1937.

Respectfully submitted,

S. Mortimer Ward, Jr.,
On Behalf of Crucible
Steel Company of America.

Raymond J. McElhannon,
Of Counsel.